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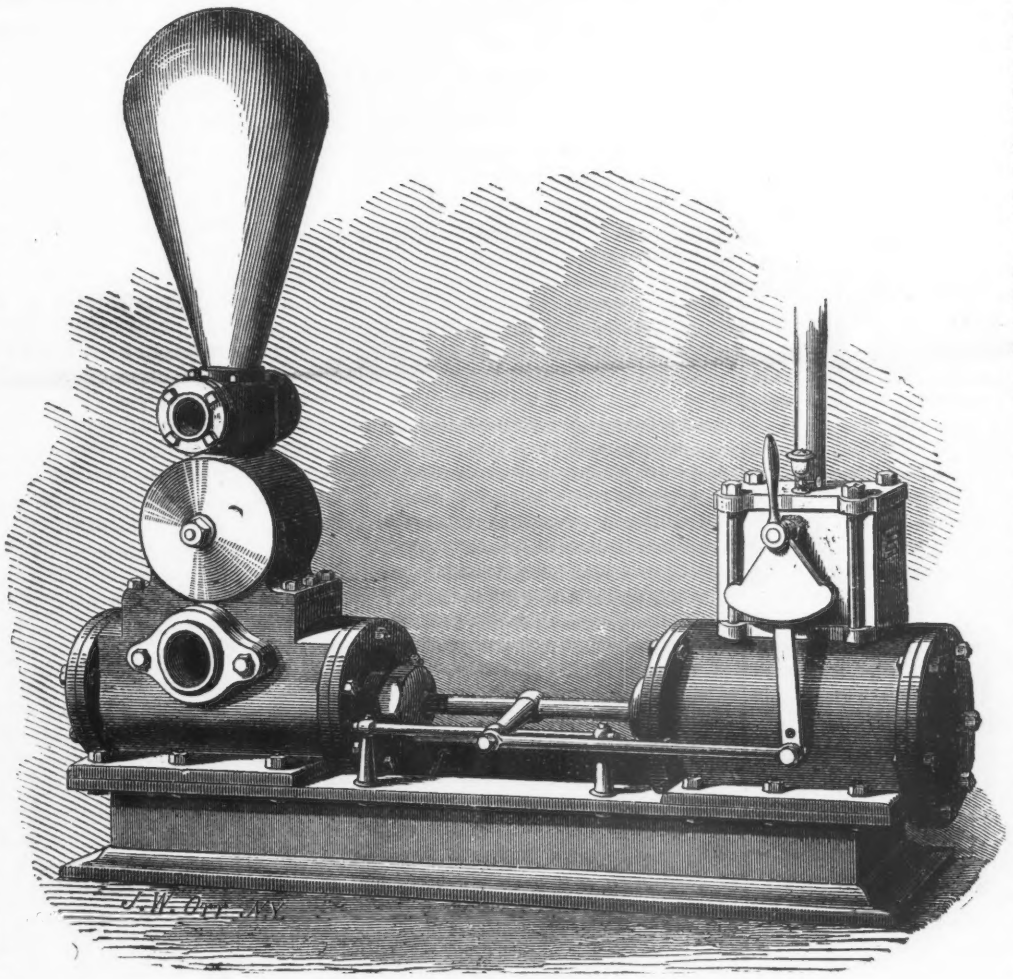
The Five Niagara Pumps.

ONE of the most noticeable collections of machinery at the Fair of the American Institute is that of Mr. CHARLES B. HARDICK, maker of the Niagara Pump. These pumps are found in so many mines, manufacturing establishments, railway stations and other places where water or other liquids are handled, or where air is supplied, or a vacuum required, that it is almost superfluous to enter into a special description of their peculiar make and virtues.

Pumping, like every other use of machinery, partakes largely of the incessant development which is witnessed in every branch of industry, as countries increase in population, and business takes on a larger scope. New uses for the pump are discovered every now and again, and the regularity of its movement, together with the power we have of neatly graduating its action, is certain to bring it more and more into use. The oil business has called for the transfer of liquids through miles of small pipe and to heights, that a few years ago were rarely attained without the use of several cylinders. One of the Niagara pumps at Fagunda, Pennsylvania, forces benzine a distance of two miles through a two-inch pipe, and to a height of six hundred and thirty feet. Others work through pipes of even seven and nine miles length, and throw their burden to an altitude of seven hundred feet.



THE NIAGARA PUMP.

The ability to do work of this kind permits us to forestall, with an inexpensive pump, engineering works which may be of a very costly description. The physicist long ago did away with the huge aquaducts of the ancients, and the pump maker is now showing the world, that perfection in workmanship, joined to a scientific knowledge of construction for the use of steam, can often supplant the engineering devices of more modern times, and even those that are still in use.

In other respects, too, the Niagara pump has proved its usefulness. Messrs. PARKIN, MARSHALL & Co. of Temperanceville, Pa., have had occasion to put a pump of this kind in the Washington coal shaft to a pretty severe test. Mr. HARDICK received a letter from them saying: "The last named Pump has been submerged in 15 feet of water at a depth of 500 feet on a slope of 45 degrees, supplied by the boilers at the top of the slope with steam. The steam having to pass through 500 feet of 1¼ pipe, including the 15 feet submerged, did actually start the Pump, and force the water to the top of the slope in the presence of many witnesses who could testify to this fact."

The requirements of a mining pump are peculiar. To the ability to raise water to great and sometimes frequently changing heights, with unfailing ease, and a construction that admits of immediately altering the capacity of the machine, from a small normal discharge to a great volume whenever occasion demands, the miner adds other virtues which to him are often a *sine quâ non*. Among these are divisability at need into small parts, and yet this must be combined with such simplicity of make, that any person of ordinary "handiness" can put the pieces together again with accuracy. When a mine is old and extensive its pumps can be designed with a pretty good knowledge of what they are to accomplish; and they will in most cases be so large that ease in setting up cannot be expected. But the great majority of mines in this country are not in so advanced a condition. They need a smaller pump and one that can be moved about from place to place as the development of the work continues. We think that most men who put a pump in one of the ill-furnished and perhaps badly opened mines, that are not unfrequently found, will agree with us in saying that lightness of parts is a very desirable thing in a pump. We have seen the work of a whole mine suspended for days for the sake of putting in a small pump, while the chance of its working at all for some months seemed a doubtful one, as the heavy machine swung down the shaft, hung on an old rope and held by a jerking gang of men.

The Niagara Mining Pump is excellently designed in view of these requirements. Its parts are few, simple and light, and it can be set with as little labor as possible, and in mines which exhibit the most ingeniously abrupt windings. The water valves are so made that they can be reached with the least possible labor; they have four surfaces which can be used one after the other, and when the valve is entirely worn out, and the factory or other machine shop cannot be conveniently reached, blocks of hard wood can be put in and will do good service. In many other respects this facility of repair has governed the construction of the pump, and probably nothing could be more conveniently arranged.

It is perfectly adapted to its purpose, can be run economically at a low speed and immediately changed to a high rate. It is commonly said in relation to competitive trials, that the runs at half speed are the really valuable ones, and that the discharge of an immense volume of water by working the pump up to its ultimate velocity proves nothing. There is, undoubtedly, truth in the first assertion, for a pump maker must look at the average requirements of his customers, and pumps are much more numerously used in manufacturies and other works, where their performance is to be in no way excessive.

But in mining it is the combination of the two that is the desideratum. The causes which have made the crevices in which ore is found, have often opened others that are empty, and serve only as water channels. A mine often becomes the sewer of a mountain, into which a thousand natural gutters pour their streams in rainy weather. The rise of water is sudden, and its accumulation immense. In such a case the highest capacity of the pump becomes a matter of very serious moment.

Of the Niagara pumps two forms are especially adapted to mining purposes. One which runs with great economy of steam, is used for pumping known daily quantities of water to a moderate height. From the fixed conditions under which it works, its performance can be closely adapted to the requirements of the case, and it therefore operates at a minimum expense. The other is able to do anything, to pump any distance and to any height; and to throw much or little water. It is in constant use in a great number of mines, and its performance is unexceptionable.

Besides mining pumps, the Niagara Works make a wrecking pump, one of which we had occasion to describe some year or two ago; boiler pumps which we believe, are used on most of the tugs that ply in New York harbor; an air pump suitable for exhausting or compressing air, the latter an employment into which it is entering with constantly increasing use, as pneumatic modes of working come into favor. The Agitator is used in oil works. All these machines present the greatest possible facility for removal of such parts as require most frequent handling, and those for the movement of liquids have valves adapted to liquids such as beer mast, and are so made that any obstruction which enters through the suction pipe can be quickly removed.

These Pumps are manufactured by CHARLES B. HARDICK, at the Niagara Steam Pump Works, 23 Adams street, Brooklyn, N. Y.

Researches on the Consumption of Heat in the Blast Furnace.

By RICHARD AKERMAN.

Translated by FREDERICK PRIME, Professor of Mining and Metallurgy, Lafayette College, Eaton, Pa.

(*Continued from Page* 187.)

IX. By the combustion of the 0.6796 lbs. carbon, in the pound of charcoal, to carbonic oxyd, we produce $0.6796 \times 2473 = 1680.6$ cal. While on the other hand, by the decomposition of the vaporized water, brought in by the blast, into oxygen and hydrogen, the heat is diminished by $0.00231 \times 29638 = 68.5$ cal. So that in reality per lb. of charcoal burnt by the blast only $1680.6 - 68.5 = 1612.1$ cal. are produced.

X. There is introduced by the blast heated to 200° C. above the temperature of the atmosphere an amount of heat of

$(0.88638 \times 0.2182 + 2.94089 \times 0.2440 + 0.02156 \times 0.4750)\ 200 = 184.2$ cal.* per lb. of coal charged.

Consequently, for each pound of charcoal used in the blast-furnace, the total amount of heat produced is $1612.1 + 184.2 \times 1796.3$ cal.

XI. According to the previous assumptions for each lb. of charcoal charged there is produced 1 lb. of pig-iron and 0.7778 lbs of slag. If now it be assumed in accordance with Rinmann's researches,† that the pig-iron flowing out of the blast-furnace carries along with it 310 cal. and the slag 440 cal., there is then consumed in heating and fusing these two products an amount of heat of $310 + 0.7787 \times 440 = 652.2$ cal. per pound of charcoal used.

XII. It has been assumed that the pig-iron produced contains 0.25 p. c. silicon, which must necessarily have been reduced from the silica in the charge by this parting with its oxygen to carbon to form carbonic oxyd. Since 0.0025 lbs. silicon are reduced per lb. of charcoal used, there have been consumed in doing this $0.0025 \times 7830 = 19.6$ cal. But on the other hand for each equivalent of silicon reduced 3 equivalents or $0.0025 \times 3 \times 12 \div 48 = 0.00187$ lbs. carbon are oxidized to carbonic oxyd; by which $0.00187 \times 2473 = 4.6$ cal. are evolved. Therefore, in fact, in the reduction of the silicon by carbon only $19.6 - 4.6 = 15$ cal. are rendered latent per lb. of coal charged.

XIII. With regard to the reduction of the iron ores it has already been shown that by that portion which oxidizes the carbonic oxyd to carbonic acid, neither a development nor consumption of heat takes place. Therefore, only that portion which is reduced by the carbon need here be regarded. It has been already stated that 12 p. c. of the free carbon in the fuel, or $0.82 \times 0.12 = 0.0984$ lbs. per lb. of charcoal charged, are necessary to reduce the ore. From this must be substracted the amount necessary to reduce the silicon, separately calculated, and there then remains, as necessary for the reduction of the ores $0.0984 - 0.00187 = 0.9653$. The amount of heat necessary to accomplish the reduction in question is $0.09653 \times 3133.3 = 301.6$ cal.

XIV. There are 22,222 lbs. of ore and flux charged into the furnace for every pound of fuel, and the former contain $15 \times 2.2222 \div 100 = 0.3333$ lbs. of carbonate of lime, which, when sufficiently heated, evolve $0.3333 \times 0.44 = 0.14666$ carbonic acid, which is combined with 0.18667 lb. of lime. The heat necessary to liberate this carbonic acid is $0.18667 \times 197{,}1 = 36.8$ cal.

XV. Since it was assumed that the charcoal used contained 10 p. c. of water, there is necessary to volatilize this water $0.1 \times (536 + 95)^* = 63.1$ cal. per lb. of coal charged.

XVI. The quantity of heat must also be determined which is lost owing to the gases passing out of the blast furnace being hotter than the outer air. For this purpose it is necessary to ascertain both the amount and nature of the gases occurring in the blast-furnace, per pound of fuel charged. These gases consist:

1. Of the steam expelled from the fuel, amounting to 0.1 lb. per lb. of charcoal.

2. Of the remaining volatile constituents of the charcoal, which, according to the previously assumed composition, consist per lb. of fuel of:

$0.559 \times 0.06 = 0.03354$ lbs. carbonic acid,
$0.228 \times 0.06 = 0.01368$ " carbonic oxyd,
$0.118 \times 0.06 = 0.00708$ " marsh gas,
$0.010 \times 0.06 = 0.00060$ " hydrogen, and
$0.085 \times 0.06 = 0.00510$ " nitrogen.

3. Of the carbonic acid expelled from the charge, which amounts to 0.14666 lbs. per lb. of fuel charged.

4. Of the gases formed by the combustion of the carbon and by the reduction it produces (per lb. of fuel charged). These gases consist, first of all, of those formed by the combustion with the blast.

$0.90613 + 0.90613 \times 12 \div 16 = 1.58573$ lbs. carbonic acid,
2.94089 " nitrogen, and
0.00241 " hydrogen;

while in addition 0.0984 " carbon are gasified by the reduction of the ores; by the reduction of the silica to silicon oxygen, amounting to $0.0025 \times 48 \div 28 = 0.00428$ lbs., is liberated; and finally the oxygen combined with the iron in the ores, which amounts per pound of fuel used to

$0.9555 \times 7 \times 16 \div 5 \times 56 = 0.3822$ lbs. oxygen.

The above mentioned 0.0984 lbs. carbon combines with 0.1312 lbs. oxygen to form 0.2296 lbs. carbonic oxyd while the remainder of the oxygen $(0.3822 + 0.00428 - 0.1312 = 0.25528$ lbs.) has combined with 0.44674 lbs. carbonic oxyd to form 0.70202 lbs. carbonic acid, Consequently the gases that have been formed by the combination of the carbon with the oxygen of the blast and by the reduction, amount per pound of fuel to

0.70202 lbs. carbonic acid,
$1.58573 + 0.2296 - 0.44674 = 1.36859$ " carbonic oxyd,
2.94089 " nitrogen, and
0,00231 " hydrogen.

The escaping furnace gases are, thererore, per pound of fuel charged into the furnace:

$0.03354 + 0.14666 + 0.70202 = 0.88222$ lbs. carbonic acid,
$0.01368 + 1.36859 = 1.38227$ " carbonic oxyd,
0.00708 " marsh gas,
$0.0006 + 0.00231 = 0.00291$ " hydrogen,
$0.00510 + 2.94089 = 2.94599$ " nitrogen, and
0.1000 " steam.

Total, 5.32047 " furnace gases.

which contain 16. 58 p. carbonic acid and 25. 98 p. c. carbonic oxyd.

The heat* carried off by these gases, if it be assumed that they escape at an average temperature of 450°C. higher than that of the atmosphere and when using the previously stated specific heats, may be calculated as follows:

$450(0.88222 \times 0.2164 + 1.38227 \times 0.2479 + 0.00708 \times 0.5929 + 0.00291 \times 3.4046 + 2.94599 \times (0.244) + 0.1 \times 0.4750 \times 350\dagger = 586.55$ cal.

(TO BE CONTINUED.)

Experiments With Dynamite.

Some important trials have been made with dynamite at Rouen. In the first place the substance was lighted by means of a match, and it was found that when the match entered deeply into the cartridge of dynamite combustion occurred without explosion; on the other hand, when the match entered but a little distance into the cartridge the explosion was terrible, and still more so when the match was primed with fulminating mercury. Some interesting trials with this blasting agent have also been made at the Biassa tunnel in Italy, which fully show the superiority of that substance over ordinary blasting powder, and especially when water is met with. Eastern end: Compact limestone and hard dolomite. (1) With ordinary blasting powder, 203 metres of tunnel driven 7·50 square metres in section, in 200 days, or at the rate of 1·015 metres per day of twenty-four hours. (2) With dynamite, 300·80 metres run of equal section in 160 days, or at the rate of 1·88 per day of twenty-four hours, showing a superiority in favor of dynamite of 0·865 per day. Western end: Rock, clayey schist, with beds of sandstone and abundant filtration of water. (1) With ordinary blasting powder- 80·75 metres run of tunnel, 7·050 square metres in section, driven in 190 days, or 0·425 per day of twenty-four hours. (2) With dynamite, 107·10 metres run of tunnel of above section in 170 days, or 0·63 per day, showing 0·25 per day in favor of dynamite.

Dr. ROBERTSON, in *Dental Cosmos*, gives an account of the destruction of a considerable portion of the jaw bone of a patient who had been poisoned by the fumes of zinc. The man was a brass founder, and in pouring the alloy of copper and zinc, the fumes of the latter were abundantly thrown off. The action of zinc fumes upon the bones of the human system appears to be analogous to that of phosphorus.

One-seventh of the cotton-cloth, one-third of the woolen-goods, and one-fourth of the iron and steel used in this country, amounting in value to the sum of $116,000,000, are manufactured abroad.

* This calculation is in so far incorrect that no allowance has been made for the changed specific heat of the gases, produced by the altered pressure of the blast when pouring out of the blast pipe.

† Transactions of the Royal Academy of Sciences at Stockholm, 1865; p. 327.

*This 95 is obtained by the author under the supposition that the temperature of the atmosphere is 5° c. and that $95 \times 536 = 631$ cal. are rendered latent for every weight-unit of water converted to steam at 100° c. F. P.

* There should properly be added to the heat carried off by the gases, the heat absorbed by these gases during their ascent in the shaft of the furnace due to the diminution of pressure; but as it is very difficult to ascertain this in the present case, and as its amount is inconsiderable, it has been omitted.

† The 350 in this portion of the equation is owing to the fact that it takes a temperature of 100°C. to convert water to steam. F. P.

NOTES ON A METALLURGICAL JOURNEY IN EUROPE.

By JOHN A. CHURCH, E. M.

The Lead Works at Mechernich.

CONTINUED FROM PAGE 180.

Only one fan is in constant use, the other being kept in reserve. In the blast house the pressure is 10½ to 11 inches of water, which diminishes to 9 at the furnaces. At the time of my visit this fan supplied 5 shafts and 1 cupel furnace.

The Charge. It has been found that a slag which is to be free from lead must contain at least 40 per cent. of oxide of iron, and as the Mechernich ore contains none of this metal, its only impurity being a very small amount of copper, iron has to be added to the charge in some form. For this purpose puddle slag is brought from Eschweiler near Belgium, and when there is any raw ore, or much unoxidized galena in the charge, a small quantity of cast-iron is also added.

The charge is made up as follows:

Roasted ore.....56—58 per cent. lead.....100		
Puddle slag..... 50		
Limestone..... 48		
Iron.....2—5		203
Coke = 9·9 p. c. of charge or 20 p. c. of ore...		20

At the time when the charge above given was taken down, the works were compelled, for lack of sufficient number of laborers at the roasting furnaces, to add raw ore, which accounts for the iron in the charge. It will be observed that the amount of coke used is very small, a consequence of the fusibility of roasted lead ore. About 35 tons of charge are smelted in 24 hours.

Products From this operation are obtained:

Lead containing 0·014—0·027 per cent. silver or 4—8 ounces to the ton.
Matte containing 10 per cent. lead.
Slag containing 0·75—1 per cent. lead.

The slag is received in iron pots 2 feet high, 16 inches in diameter at the top and 6 inches at the lower end. In these the matte settles to the bottom, nearly every block yielding 10—25 pounds. But to make this settling of the matte sure, it is indispensable that the pot be rapidly filled. When this system of drawing-off slag was first introduced, several trials were deemed unfavorable which failed, only because the slag was allowed to drop slowly into the pot, and the lower half of the contents became solid before the upper half ran in. Perfect fluidity of the mass is necessary for the settling of the matte, and for this reason the furnace must be a closed one; a form which has many advantages besides the collection of small quantities of matte which might otherwise be lost.

DESILVERIZATION OF THE LEAD.

In former times three out of the five systems of desilverization by zinc were practiced at Mechernich and in its neighborhood. The differences, as with all these methods, were in the method of dezincing the lead after the silver had been removed. These three methods will be considered in describing this and the following works.

At Mechernich the kettles hold 11 to 12 tons each. The zinc amounts to one and one-twelfth per cent. of the lead and is added in 3 portions: (1) 0·75 per cent.; (2) 0·25 per cent., (3) 0·083 per cent. On 11 tons this is 165, 55 and 18¼ pounds; total 238¼ pounds. The zinc alloy is ladled into moulds and the pigs are heated in a tube slightly inclined. By raising the temperature gradually a good deal of the lead runs out leaving an alloy much richer in silver. Toward the end of the operation the alloy is stirred with a rod until it becomes quite "dry," and has the form of lumps or shot. It is then melted and cast. Its silver now amounts to 1·5 to 2·5 per cent., but much richer alloy is sometimes obtained.

The lead which runs from this tube contains 0·012—0·020 per cent. silver and passes again through the process of desilverization.

Treatment of the rich alloy. These works retain the old method, rejected nearly everywhere else, of fusing the rich alloy with puddle slag to remove the zinc. The fusion of silver at a high temperature in the presence of zinc should, according to all laws of metallurgy, be an operation attended with considerable loss, and great care is taken to make this as small as possible.

The furnace is 10 feet high and 2½ feet square, and has 3 tuyeres. It is first started with puddle slag alone, and when this is flowing freely, the alloy is charged.

To 100 of alloy 90 parts of puddle slag are added and smelted with 17—18 coke. The pressure of the blast must not be more than 6 inches of water. About 7,700 pounds of this mixture are smelted in 24 hours, and the loss is said to be not more than 1 per cent. of lead at the outside.

The rich lead, now freed of its zinc, is poled for one hour in a kettle, and cupelled in an English furnace, having the ordinary elliptical test, with axes of 3 and 4 feet. The run lasts 5 to 6 days, 13,000 pounds weight of lead is cupelled, and the button of silver weighs about 150 pounds. The tuyere is a pipe 2 inches high and 6 inches wide, the blast passing through a zinc pipe 3—4 inches in diameter. It is the experience of many works, that a large tuyere of this kind makes poorer litharge than one with a narrower orifice.

The poor lead is de-zinced in a similar manner. It is charged with puddle slag in the proportion of 100 lead, 4 to 5 puddle slag, and 3 to 4 coke. It is then poled and cast. It is very pure, as the following analysis by Mr. EISENHUT, chemist of the Company, shows:

Silver	0·00025
Copper	0·0025
Antimony	0·0050
Iron	0·0030
Zinc	trace.
Nickel	0·0021
Lead by difference	99·98715
	100

THE NEW PROCESS.

Within three years the method of de-zincing by steam has been introduced at Mechernich. When the third alloy has been taken off, steam is introduced for two hours, the lead being kept at a red heat, and covered with a close hood. Then the hood is opened to allow the air to enter and the passage of steam is continued one hour, to remove the antimony. The new method produces more scraps but saves in labor. Its chief advantages, however, are the more perfect removal of antimony and the complete removal of the nickel, which by the analysis last given is seen to be present in small quantity. What alteration the change has had upon the quality of the lead is to be seen from the following average of two analyses, made by Mr. EISENHUT upon lead produced by the steam process:

Silver	0·00052
Copper	0·00175
Antimony	0·00405
Iron	0 00064
Lead by difference	99·99304
	100

Treatment of the Matte. Matte amounting to about 2 per cent. of the ore's weight is obtained from the fusion of the ore. It is roasted and smelted with lead scraps to second quality lead. This contains more antimony than the first lead, but still considerably less than one per cent. but sufficient to give it a silvery whiteness. It is partly made up into shot, an old shaft in the mine serving for a shot tower, and the shot being made on English and American account.

THE COMMERN WORK.

Messrs. PIRATH & JUNG have a similar establishment in Commern near Mechernich, and treat ore from the same sandstone layer. Their mine, however, produces less galena in proportion to the lead carbonate than the other, and they consequently have less unaltered galena in the roasted ore. The record of two of their roasting furnaces for three weeks is interesting:

	Furnace No. I.		Furnace No. II.	
	Coal lbs.	Ore lbs.	Coal lbs.	Ore lbs.
August 7.....	28,400	180,500	32,200	186,500
" 14.....	30,400	176,000	31,800	188,750
" 21.....	29,400	190,000	30,200	203,000
	88,200	546,500	94,200	578,250

Total ore roasted.....1,124,750 lbs.
" coal consumed..... 182,400 "

This amounts to a consumption of 16·21 per cent. of coal, and a daily product of 53,580 pounds from two furnaces. There are no analyses of the roasted ore at hand but its composition is pretty nearly: silica 35, lead oxide 55, clay, iron, sulphur, copper and antimony, 10. Limestone is sometimes added in roasting; but only where there is too little lead present.

The furnaces have the following dimensions:

Height.....	14 feet.
Section.....	4×4
Tuyeres.....	4
" height above top.....	17 inches

The material is red brick and the campaign usually last 3 to 4 months. The charge is composed of

Roasted ore.....44,000	pounds.
Unroasted ore..... 9,900	"
Limestone.....18,900	"
Puddle slag.....27,500	"
Coke 11—12 per cent.....11,660	12,650 "

The amount reported to be passed through these furnaces daily is enormous; amounting to 132,000—143,000 pounds, and if the Mechernich works, with the same ore and the same furnaces smelt only 38½ tons in 24 hours with 10 per cent. of coke, it is hardly possible that the Commern works put through 66 to 71 tons with 11 to 12 per cent. fuel. The latter quantities are fully equal to the largest charges the much larger furnaces of Freiberg have run through, when the charge consisted almost entirely of fusible slag.

Each furnace at Commern produces 27,500—28,600 pounds of lead daily. The slag is reported to contain 0·3—0·4 per cent. lead, and the lead about 6 ounces to the ton.

In the method of desilverization (before the introduction of the steam process) there were some differences from that pursued at Mechernich. After melting in the kettle the lead was first poled to remove all impurities. Poling consists in plunging a stick of green wood in the melted metal, which is hot enough to char it rapidly. It gives out a great quantity of gas, partly composed of steam from the large amount of water contained in green wood and partly carburetted compounds resulting from the decomposition of the fibre. The

escape of these gases throws the bath into violent ebullition and every part of the metal is brought to the surface, where the lighter alloys of iron and copper with zinc remain. As at the neighboring works 1·08 per cent. of zinc is added in three operations, but the amounts are varied, being 1st. 0·66 per cent., 2nd. 0·34 per cent., 3d. 0·083 per cent.

The chief point of difference is in the treatment of the poor lead, in order to free it from zinc, the old method, suggested when the zinc process was first invented being, in use. The lead is melted in a reverberatory furnace under a layer of coal, on which is a layer composed of salt 2 parts, sand 1 part and lime 1 part. The furnace holds 22,000 pounds, it is treated for 8 to 9 hours and the product is "best selected" lead, the purity of which is sufficiently proved by the following analysis made at Clausthal in 1869 :

Silver	0·0023
Copper	0·0034
Antimony	0·0081
Iron	0·0013
Lead by difference	99·9849
	100

THE WORKS AT CALL.

The works at Call[3] were established for the purpose of working over old slag, left by the Romans, or some less ancient people, and this material is still treated, but the bulk of the the lead is made from purchased ores. The latter are obtained in Westphalia and also at Stolberg. They are mixed with brown spar, copper pyrites, zinc blende, and the lead contains about one-half per cent. of antimony. Of silver the lead contains about 0·025 per cent. or 7·3 ounces per ton,

As at Mechernich the ore is first roasted ; the furnace being 45 feet long and 7 feet wide with double sole, which gives 90 feet of hearth length. This furnace will hold about 88,000 pounds of ore, which is charged every 6 hours in posts of 3,300 pounds. Four posts are drawn daily so that 13,200 pounds or 6½ tons are roasted daily. Like the Mechernich furnaces there is a deep hearth next the fire place where the roasted ore is melted, and the furnace is tapped every 12 hours. From these figures it will be seen that the ore remains from 6 to 7 days in the furnace.

The blast furnaces at Call are remarkable in these days for having but one tuyere. They are 19 feet high, 4 feet from front to back and 3 feet wide. The top is closed by a hopper built of brick and lined with cement. This hopper is large enough to contain one charge. It is closed by a slide which, being pulled out, lets down the charge. The hearth is narrowed a little to prevent the formation of sows. The blast is by fans and the pressure 8 inches of water. Another furnace is square and has 3 tuyeres.

3. Preuss Zeitschrift, 1868, p. 268.

SEPARATION OF SILVER.

The lead which on an average contains 250 grains silver in 1000 kilograms, or a little more than 7 ounces to the ton, is melted in kettles of 7 feet diameter and 22 inches depth, holding about 25,000 pounds. The dross is taken off, the lead heated until zinc melts readily on it, and 198 pounds of zinc is then added, stirred for half an hour and suffered to cool until the zinc solidifies on the surface, when it is taken off. This zinc crust is at first about 3 lines thick, but the removal of the surface lead is continued until the lead begins to crystallize which it has been found, takes place when about 2 inches of the bath have been removed.

The first charge of zinc having been taken off the kettle is filled up with liquated lead, 68·2 pounds of zinc are added, and after a repetition of the above process a third charge of 38·5 pounds of zinc is put in. By these three charges 304·7 pounds of zinc have been added or close on 1¼ per cent., and the silver left in the kettle is reduced to 0·00055 per cent. or 0·16 ounces. The source from which this liquated lead is obtained will be seen below.

The lead originally contained about 0·15 per cent. of antimony and 0·2 per cent. of copper. It now has nearly all the antimony concentrated in the remaining lead, but is nearly free from copper, which has followed the silver in uniting with the zinc.

To remove the zinc a method was formerly employed which was the invention of Mr. HERBST, one of the proprietors of the works. It is to this gentleman that metallurgists owe the re-introduction of the zinc process after it had lain many years neglected. His improvements and perseverance established the process on a successful basis for the first time, and the remarkable advances made in this method during the last ten years had the following process for a starting point, though it has since been abandoned in nearly every works.

The lead containing zinc was heated to a dark red and covered with an intimate mixture of 110 pounds salt and 320 pounds lead sulphate. For lead containing 0·6 per cent. of zinc, about 330 pounds of this mixture was charged to each kettle. Soda sulphate and zinc chloride were formed, but the larger part of the zinc must have been removed as zinc oxide. For 24·750 lbs. lead at 0·6 p. c. contain 1485 pounds of zinc, requiring 163 pounds of chlorine to make Zn. Cl. But the 110 pounds of salt charged contain only 77 pounds of chlorine, very much of which remains as sodium chloride. The "salt slag" remaining consisted of unaltered sodium chloride, lead sulphate, mingled with zinc oxychloride, soda sulphate and metallic lead. After twenty-four hours the zinc was all removed.

The lead now contained no impurity but antimony, and it was with a view to the removal of this troublesome ingredient that the peculiar kettles used at Call (and I believe no where else) were designed.

Antimony cannot be removed by steam, but requires for its oxidation the slow action of air upon the heated lead. When steam is used for the removal of this metal, as at Mechernich and many other works, it acts merely as a mechanical stirrer of the lead, throwing it up and changing its surface constantly, so that every particle is brought in contact with the air.

At Call after poling the lead for half an hour it is kept a long time, usually 48, sometimes 72 hours at a red heat, and covered by a layer of lime which prevents the volatilization of the lead, but does not hinder the access of the air. Lead containing up to one per cent. of antimony can be softened in this way ; that at Call sometimes reaches one-half per cent.

From these operations results a metal of great purity as the following analysis shows :

Silver	0·0005
Copper	0·0004
Antimony	0·0008
Iron	0·0019
Bismuth	0·0023
Thalium	0·0003
Lead	99·9938
	100

The management of the zinc alloy is peculiar. The alloy produced by the second and third charges of zinc is kept separate from that obtained from the first addition of zinc. The former is very much adulterated with lead. It is melted in a kettle, the alloy rising to the top, while a "liquated lead" containing about 3·5 ounces silver to the ton remains under it. The temperature is raised nearly to bright red, at which the overlying layer of alloy oxidizes. When this oxidation is complete, the lead is drawn off by a spout, leaving the oxides with nearly all the silver behind. The lead goes back to the second and third additions of zinc as before said.

The oxides are mixed with about one-half their weight of chlorhydric acid, at first in the cold and afterwards the solution is completed at a low heat. When the solution is finished the liquid is evaporated until it becomes thick, a sign that all the water is removed. Then the alloy resulting from the first charge of zinc is added. In this the lead and zinc are still in the metallic state and a reaction sets in ; the zinc is all converted into chloride and the lead and silver mostly to metal. This process takes 24 hours.

By this means a rich lead containing 1 5 to 2 per cent. of silver is obtained which is cupelled. The method has the advantage of superseding the dezincing of the alloy by steam, an operation not free from hazard, and one that is always a disturbing element in the zinc process.

The residue contains from 20 to 55 per cent. of lead chloride, the remainder being zinc chloride with 17—25 ounces to the ton. We have seen that the zinc in the 2nd and 3d alloys was transformed into zinc chloride by treatment with lead sulphate and sodium chloride at a high heat ; the result was soda sulphate and zinc chloride. Precisely the opposite reaction is now produced by mixing these residues containing lead chloride, with "salt slag" obtained in de-zincing the poor lead, and treating them with water acidified with chlorhydric acid.

This acid changes the zinc oxychloride to neutral zinc chloride, which is soluble. Copper chloride and silver chloride are also dissolved, the latter in consequence of the other chlorides in solution. But the lead chloride is transformed to insoluble lead sulphate by reaction with the soda sulphate. We have then the original mixture of salt and lead sulphate restored. After settling, the liquor is run to a vat containing copper where the silver is deposited, and to another containing iron where the copper falls down.

By these separations the liquor now contains nothing but zinc chloride, and iron sub-chloride. The addition of chlorine transforms the latter to per chloride, which is precipitated by lime. The remaining solution of zinc chloride is heated and the zinc precipitated in oxide by pure lime, super saturation being carefully avoided. The zinc oxide is finally distilled to metallic zinc.

This process is an excellent example of a simple method of treating the rich alloy by acids, a treatment which in many places is forbidden by the high price of chlorhydric acid. It does not appear that the acid is particularly cheap at Call, but the small percentage of silver in the lead, and the consequently small amount of alloy to be treated, gives the acid method advantages over the treatment by fusion with slag, or by steam. The silver is obtained more quickly than would be the case if the rich alloy had to be accumulated until enough was at hand to fill a kettle, say 15,000—20,000 pounds ; or to support a campaign in the furnace, which would require even more. Thirty centners or 6,600 pounds suffices for the treatment with acid. It is to be remarked, too, that the shallow and extremely wide kettles, in use at this place, may not be well adapted to the use of steam ; though that question is still unanswered, as I believe steam has not been applied to kettles like them. Those recommended by CORDURIÉ are very deep and of small diameter ; while those in the Hartz are 2 feet 10½ inches deep and 5 feet 6½ inches in diameter, and this is about the size of the old Pattinson kettles in most works, which have been used without alteration for the zinc process.

But the process described above is no longer in use at Call. Mr. HERBST has invented another which he keeps secret, unwilling to give his discovery gratuitous circulation and dissatisfied with the Prussian patent laws, which he thinks have not given him protection enough. His new method is said to be cheaper than any other yet introduced.

[TO BE CONTINUED.]

THE COAL TRADE.

NEW YORK, Sept. 21th, 1872.

Anthracite Coal.

The long hoped for advance in prices has come halfway at least, and by the first of October it will have finished one stage of its course. Prices have been advanced by the Pennsylvania Coal Company 30 cents on stove, and 20 cents on all other sizes, and on the first of the month another increase probably of 30 cents, will be made.

The exact amount of the coming advance cannot be stated until the amount of the general advance is fixed. But that will undoubtedly be 50 cents, or at least not less than that, and the Company's rate will be put up enough on the 1st proximo, to bring its prices up to the standard. Delaware and Lackawanna coal is now 25 cents a ton higher and 30 cents along the line of the Erie railway. That too will go up still further when the general advance is made.

Besides making a step forward in price, coal has also begun to be in extraordinarily active demand. The promised increase in price is discounted, rates among dealers being often 20 to 30 cents above the regular market. Part of this is sound and part is speculative activity. Yard stocks are diminishing and the call on producers is a heavy one. But it is not enough to account for the condition of incipient panic which is observable in some quarters. Some dealers are discounting the future a little too eagerly, and in their haste to pick up odd lots at a half advance, give the impression of a demand that does not really exist among consumers. The appearance of a panic is there, but the reality is not to be found.

This indiscretion on the part of a few speculative dealers is looked upon by the more careful ones, with some apprehension. They fear that the over active appearance of the trade may induce hasty conclusions on the part of those who have the control of prices in their hands, and lead them to make too bold an advance. A year ago the rising tendency of the market led to a mistake of that kind which cost the trade a dull ending to October. At present the signs of real activity and soundness of trade are sufficient to warrant the expectation of a steady increase of rates from time to time until the coal business is again in as flourishing a condition financially, as its product is extensive. And we think there is little to be feared from the movements of speculators. Even allowing that there is an exceptional eagerness to obtain stocks, it is a movement which grows out of an advance already decided upon, and those who fixed the limit of the increase did it upon other grounds than a mere temporary exhibition of greedy competition. The severe burdens that still rest upon the trade, in consequence of the low prices which have characterized so much of the year, have made their bearers cautious, and there is still enough of that diffidence, to which we adverted last week, to make the leaders careful in manipulating prices. Probably, the general feeling that coal will be just 50 cents higher and no more, next month, is well grounded.

But woe to those who have failed to buy while low prices ruled the day! Coal, tolls and freight are all going up at one time. Mr. GOWEN is to fix his rates of toll to-day or to-morrow, and it is thought he will add 30 or 40 cents to the present charges. Freights have not gone up yet though they are perhaps a little stiffer and must advance very soon, as usual at this season. To Boston and Portland, parties who can give immediate despatch pay $1,75, to Portsmouth $1.90 and to Newburyport $2. At Port Johnson, Hoboken and Elizabethport there is no lack of freights, but rather such a supply that vessels suffer a good deal of detention.

The Bituminous Trade.

In this branch of the coal trade, matters though quieter than in the Anthracite business, are advancing steadily. Business is active and prices are somewhat better. The Consolidated Company ask $4,60 at Baltimore. We are glad to learn that this company has fairly begun the supply of West Indian and South American ports, on British account. The coal is shipped from Alexandria and Georgetown, and the trade is improving every day. With prices in their present condition in England, and a general advance in the wages there that can hardly recede to their old stand-point, American producers may look forward to obtaining and holding an important export trade with the nearer colonial ports that have hitherto relied upon English mines.

Pennsylvania Coal Company.

Shipments of Pittston Coal, for the week ending September 14, 1872.

	1872. WEEK.	1872. YEAR.	1871. WEEK.	1871. YEAR.
By Railway	26,516 00	837,795 08	26,512 02	423,795 00
" Canal	.....	4,075 12	958 10	9,145 18
Total	26,516 00	841,871 00	27,470 12	438,940,18
Increase 1872		402,930 02		

Anthracite Coal Trade for 1871 and 1872.

The following table exhibits the quantity of Anthracite Coal passing over the following routes of transportation for the week ending Sept. 14, 1872, compared with the week ending Sept. 16, 1871.

COMPANIES.	1871. WEEK.	1871. TOTAL.	1872. WEEK.	1872. TOTAL.
*Phila & Reading R.R†	152,018	3,736,795	131,424	4,010,781
Schuylkill Canal	51,621	688,978	21,859	584,016
*Lehigh Valley R. R.	72,432	1,469,327	60,259	2,378,731
Lehigh & Sus. R. R.	29,373	820,684	31,793	1,223,607
Lehigh Canal	33,187	413,172	21,125	527,022
Scranton North	19,907	316,232	21,309	512,643
" South	43,515	706 652	38,085	1,509,388
Penn. Coal Co., rail	26,512	429,795	26,516	837,795
" " " canal	958	9,146	....	4,076
Del. & Hud. Canal Co.	33,963	615,715	43,470	990,5 6
" East	9,736	208,399	10,725	422,376
" " West	4,436	69,208	8,912	274,986
" " South	10,027	197,413	10,582	269,338
Shamokin	10,105	452,243	10,668	385,315
Trevorton	....	.....	....	....
Lykens Valley Coal Co.	2,116	65,613	..	2,085
Wyoming North	....	.....	....	....
Wyoming South	....	....	....	....
P. N. Y. C. & R. R. Co.	....	104,987	10,303	452,111
Williamstown Col'y	....	....	....	...
Big Lick Col	3,802	103,410	....	10,591
Total	504,908	10,407,169	447,030	14,395,427
1870	447,030			10,407,169
Increase				3,988,258
Decrease	57,878			

* These figures are for the week and fiscal period commencing Nov. 30

†Less coal transported for Co's use and Bituminous coal.

Bituminous Coal Trade, 1871 and 1872.

The following table exhibits the quantity of Bituminous Coal passing over the following routes of Transportation for the week ending Sept., 14, 1872, compared with week ending Sept. 16, 1871.

COMPANIES.	1871. Week.	1871. Year.	1872 Week.	1872 Year.
C. & O. Canal	14,507	480,882	15,308	452,785
B. & O. R. R.	24,627	879,559	22,394	875,288
H. & B. T. R. R.	3,796	230,973	6,496	212,842
*Harrisburg & D.	8,089	397,114	9,726	359,189
*L. V. R. R.	8,545	284,790	316	21,313
P. & N.Y.C. & R. Co.	....	.....	6,057	269,764
Cumberl'd Branch Canal	5,594	142,199	5,412	154,255
" Railroad	1,914	51,679	268	12,987
Total	67,072	2,467,196	65,977	2,358,423
	65,977	2,358,423		
Decrease	1,095	108,773		
Increase				

Report of Coal Transported over Central R.R. of N. J. (Lehigh and Susq. Div.)

Week ending September 14—Compared with same time last year.

WHERE SHIPPED FROM	WEEK 1872., tons ct	WEEK 1871., tons ct.	YEAR 1872 tons cwt.	YEAR 1871, tons.cwt.
Wyoming Region	30287 18	31449 08	1033990 14	849488 13
Upper Lehigh Region	4273 15	4302 07	140821 06	52142 01
Beaver Meadow Region				
Hazleton Region	6058 17	12672 08	172639 09	104395 00
Mahanoy Region				
Treskow Region	2640 19	3774 03	106613 08	37723 13
Mauch Chunk Region	11113 00	5100 15	315396 10	136084 07
Totals	54384 09	57299 01	1774161 07	1179813 14
Increase			594627 13	
Decrease	2914 12			
DISTRIBUTION.				
Forwarded East of Mch Chunk by Rail	31792 13	29972 12	1223606 18	820083 17
Forwarded East of Mch Chunk by Canal	15116 17	21751 12	339732 12	234313 09
Delivered at and above Mauch Chunk	1039 04	1097 17	41019 07	41197 00
L. V. R. R at Packer'n	180 15	378 16	10281 19	23559 04
Delivered to L. & B. R. R. at Plymouth Bridge	6225 00	4098 04	159820 11	60630 04
Totals				
Of the above there was transported on acc'nt of L. C. & N. Co.	16805 01	10102 05	457947 03	194233 06
W.-B. C. & I. Co.	17146 02	16731 09	703493 17	593532 15
Totals	33951 03	26833 14	1161441 00	787766 01
Increase	7117 09		373674 19	
Decrease				

Delaware and Hudson Canal Company.

Coal mined and forwarded by the Delaware and Hudson Canal Company for the week ending Saturday, September 14, 1872.

	WEEK.	SEASON.
North	51,078 10	1,814,931 12
South	10,582 10	269,338 05
Total 1872	61,661 00	2,084,269 17
Corresponding time in 1871:		
North	57 034 11	896.471 00
South	10,026 17	197,412 14
Total	67,061 08	1,093 883 14
Increase North		
Decrease North		
Increase South		
Decrease South		
Total increase 1872		990.386 03
Total decrease 1872	5.400 08	

Delaware and Hudson Canal Company.

The following is a statement of Coal Transported by the Delaware and Hudson Canal Co. for the week ending Sept. 14, 1872.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	43,470	990,566
By Railroad, East	10,725	422 376
" " West	8,912	274 986
" " South	10,582	269,338
Total Tons	73,689	1,957,266

For the same period last year.

	FOR THE WEEK.	FOR THE SEASON.
By Delaware and Hudson Canal,	33,963	615,715
By Railroad, East,	9,736	208.399
" " West	4,436	69,208
" " South	10,027	197,413
Total Tons	58,162	1,090,735
Increase	866,531	

Philadelphia & Reading Railroad and Branches.

COAL TONNAGE

For the Week ending Saturday, Sept. 14, 1872.

BY RAILROAD.—ANTHRACITE.

PASSING OVER MAIN LINE AND LEB. VAL. BRANCH.

	Tons.	Cwt.
From St. Clair	37,769	0
" Port Carbon	5,287	10
" Pottsville	3,860	14
" Schuylkill Haven	22,161	17
" Pine Grove	5,323	19
" Tamaqua	16,144	05
" Harrisburg	3	00
" Dauphin	7,130	02
Total	97,680	07

FOR SHIPMENT BY CANAL.

Passing Frackville Scales	7,924	07
" Mill Creek "	2,997	15
" Schuylkill Valley Scales	130	11
" Mt. Carbon "	1,351	14
" Cressona "	7,781	04
" Pine Grove "		
" Tamaqua "	867	14
Total	20,152	15

SHIPPED WESTWARD VIA NORTHERN CENTRAL RAILROAD.

Passing Locust Gap	865	00
" Shamokin	5,189	09
" Herndon	.....	
Total	6,051	09

SHIPPED WEST OR SOUTH FROM PINE GROVE.

Via Schuylkill & Susquehanna R. R.	829	18
" Lebanon & Pine Grove Branch	792	02
Total	1,622	00

CONSUMED ON LATERALS.

From Frackville Scales	591	14
" Mill Creek "	443	10
" Schuylkill Valley Scales	1,208	09
" Mt. Carbon "	989	16
" Cressona "	276	12
" Pine Grove "	62	08
" Tamaqua "	938	11
Total	4,191	00

LEHIGH AND WYOMING COAL.

Received via Allentown, E. Penn'a Br.	130	00
" " Alburtis, "	.....	
" " Oreland, G. & N. Br.	1,133	06
" " Connecting R. R.	.....	
" " Willow Street R. R.	460	03
Total	1,723	09

BITUMINOUS.

From Harrisburg	9,666	00
" Connecting R. R., G. & N. Br.		
" Junction R. R.	60	00
Total	9,726	09

COAL FOR COMPANY'S USE.

Anthracite	5,148	05
Bituminous	199	07
Total	5,347	12

RECAPITULATION.

	Total for Week.	Corres-p'g week last year.	Increase and Decrease.
Passing over Main Line and Leh. Val. Branch	97 680 07	108,505 00	d 10,824 13
For Shipment by Canal	20,152 15	32,048 03	d 11,895 18
Shipped Westward via Northern Central R. R.	6,054 09	4,809 14	i 1,244 15
Shipped West or South from Pine Grove	1,622 00	2,517 13	d 895 13
Consumed on Laterals	4,191 00	2,684 00	i 1,507 00
Lehigh and Wyoming Coal	1,723 09	1,452 11	i 270 18
Total Anthracite paying freig't	131 474 00	152,017 11	d 20,593 11
Bituminous	9,726 09	8,088 14	i 1,637 15
Total of all kinds paying freig't	141,150 09	160,106 05	d 18,955 16
Coal for Company's use	5,347 12	3,888 12	i 1,459 00
Total Tonnage for Week	146,498 01	163,994 17	d 17,496 16
Previously this year	4438979 15	4140202 18	i 298,677 07
Total to date	4585377 16	4304177 05	i 281,180 11

SHIPPED BY CANAL.

From Schuylkill Haven	20,812 00	31,104 15	d 10,292 15
" Port Clinton	1,047 00	2,703 00	d 1,656 00
Total Tonnage per Week	21,859 00	33,807 15	d 11,948 15
Previously this year	562,156 15	647,329 17	d 85,173 02
Total to date	584,015 15	681,137 13	d 97,121 17

Report of Coal Transported over Lehigh Valley Railroad

Report of coal tonnage for the week ending Sept. 14, 1872, with totals to date, compared with same time last year.

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	TOTAL Tons. Cwt.
Total Wyoming	9,537 13	405,832 19
" Hazleton	46,807 08	1,714,571 15
" Upper Lehigh	53 05	2,122 19
" Beaver Meadow	17,846 07	592,766 17
" Mahanoy	5,276 13	297,769 18
" Mauch Chunk	28 05	2,323 03
Total	79,499 11	3,015,833 11
Same time last year	100,788 17	1,824,841 17
Increase		1,190,991 14
Decrease	21,289 06	
Forwarded East from Mauch Chunk by rail	61,258 17	2,378,730 14
Same time last year	72,431 17	1,469,326 11
Increase		909,404 03
Decrease	12,173 00	

DISTRIBUTED AS FOLLOWS.

Forwarded East from Mauch Chunk by rail	59,032 02	2,341,852 18
do East for use L. V. R. R.	1,226 15	36,877 16
Delivered at and above Mauch Chunk for use of L. V. R. R.	853 11	44,937 18
To P. & N. Y. R. R.	8,089 14	278,556 03
To N. C. R. R., at Mount Carmel		1,952 05
To D. H. & W. R. R.	885 11	21,581 05
To L. & S. R. R. at Packerton for rail	170 04	20,056 07
Delivered at M'h Chunk		1,325 10
Delivered on line of road above Mauch Chunk	356 12	12 433 04
To L. S. & R. R., at Penn Hav., for railroad		4,001 00
Do. for canal	5,873 06	165,717 19
To Lehigh Canal Mauch Chunk	2,890 03	86,908 15
To Catawissa Railroad	135 13	9,625 16
Total	79,499 11	3,015,833 11

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday Sept. 14. and during the year 1872, compared with the corresponding period of 1871.

WEEK.

	To C. & O. Canal Tons. Cwt.	To B. & O. R. R. C. Tons. Cwt	Total. Tons Cwt.
1872	15,307 12	22,294 03	37.701 15
1871	14,506 18	24,627 05	39,134 03
Increase	800 14		
Decrease		2.233 02	1.432 08

YEAR.

1872	452 785 01	875.288 06	1,328.073 07
1871	480.881 13	879,589 03	1,360,440 16
Increase			
Decrease	28,036 12	4,270 17	32,367 09

Cumberland Branch R. R.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To B.&O.R.R. Co Tons. Cwt.	Total. Tons. Cwt
1872	5 411 14	268 04	5,679 18
1871	5,594 02	1,913 16	7,507 18
Increase			
Decrease	182 08	1,645 12	1 828 00

YEAR.

1872	154,254 11	12,986 19	167,241 10
1871	142,199 06	51,679 07	193,878 13
Increase	12,055 05		
Decrease		38,692 08	26.637 03

Penn. and N. Y. R. R.—Coxton, Pa.

Coal tonnage for week ending September 14, 1872.

	Week. Tons. Cwt.	Total. Tons. Cwt.
Anthracite received :		
From Lehigh Valley R. R.	8.089 14	278,556 03
" Lack. & B. R. R.	739 08	60,876 09
" Pleasant Valley R. R.	360 14	73,540 07
" Sul. & Erie R. R.	1,113 13	39,137 17
Total	10,303 09	452,110 16
Distributed :		
To Lehigh Valley R. R.	....	30,610 06
To Lack. & B. R. R.		1.017 17
To S. Central R. R.	2,254 06	81,686 12
To Ithaca & A. R. R.	428 04	73,376 16
To Erie R. W. Pockets for shipm't.	6,039 10	205,443 13
To individuals on line of road	477 01	15,455 02
To points at & above Coxton for use of Co.	89 12	18,318 00
To points between Waverley and Elmira	1,014 16	26,202 10
Total	10,303 09	452,110 16
Bituminous received from BARCLAY R. R.		
Shipped north from Towanda	6,036 12	267,617 10
Shipped south from Towanda	20 03	1,975 11
Northern Central R R.	.....	170 10
Total	6,056 15	269,763 11
Distributed :		
To Erie Railway	5,267 05	241,065 17
To So. Central R. R.	769 07	26,364 08
To Ithaca Valley R. R.		57 05
Lehigh Valley R. R.	13 05	1.158 07
To individuals on line of Railroad.	6 18	862 10
To points on line of road for use of Company	....	255 04
Total	6,056 15	269,763 11
Grand totals transported :		
Anthracite	10.303 09	452,110 16
Bituminous	6,056 15	269,763 11
Total	16 360 04	721,874 07

Lehigh Coal and Navigation Company.

Report of Coal transported over the Lehigh Canal and L. & S. Div of Central Railroad of New Jersey for the week ending Sept. 14, 1872, and for the year 1872.

	WEEK.	YEAR.
Forwarded East of M'ch Chunk by Rail	31,792 13	1,223,606 18
Delivered at and above do.,	1,069 04	41,019 07
Forwarded East of do., by Canal	21,124 15	527,021 15
	53,986 12	1,791,648 00
Corresponding period last year—		
Forwarded East of M. Chunk by Rail..	29,972 12	820,083 17
Delivered at and above do., ..	1,097 17	41,197 00
Forwarded East of do., by Canal	33,187 09	413,172 07
	64,257 18	1.274.453 04
Increase on Railroad	1,791 08	403,345 08
Decrease " "	.....	.....
Increase on Canal	.....	113,849 08
Decrease " "	12,062 14	
Of the above there was transported on account of—		
Lehigh Coal Nav. Co.	24,360 08	681,776 01
Wilkesbarre Coal & Iron Co.	17,146 02	703,493 17
	41,506 10	1,385,269 18
Corresponding period last year—		
Lehigh Coal & Nav. Co	19,286 09	353,098 08
Wilkesbarre Coal & Iron Co.	16,731 09	593,532 15
	36,017 18	946,631 03
Increase	5,488 12	388,638 15

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, September 14, 1872.

	Tons. Cwt.
From Schuylkill Haven	20,812 01
" Port Clinton	1,047 00
Total for week	21,859 00
Previously this year	562,156 15
Total	584,015 15
To same time last year	628,977 12

Northern Central Railway, Shamokin Division.

Below is the return of Coal sent over the Shamokin Division of the N. C. R. W., for the week ending September 14, 1872.

	Tons. Cwt.
East	1,761 17
West	8,906 00
	10,667 17
Same time last year	10,705 09
Increase	
Decrease	37 12
Total amount shipped to date	385,31± 11
Same time last year	452.243 08
Decrease	66,928 17

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna, & Western Railroad for the week ending Saturday, Sept. 14, 1872.

	WEEK. Tons. Cwt.	YEAR. Tons. Cwt.
Shipped North	21,308 14	512,642 18
Shipped South	34,085 10	1,509 388 10
Total	58,394 04	2,022,031 08
For the Corresponding time last Year :		
Shipped North	19,907 06	316,232 01
Shipped South	43,515 02	706,652 08
Total	63,422 08	1,022,884 10
Increase		989,146 18
Decrease	5,028 04	

Lehigh Canal Coal Trade.

Shipped for the week ending September 13, 1872.

	Week. Tons. Cwt.	Week. Tons. Cwt.
Total from Mauch Chunk Region	7,555 07	173,828 18
" " Beaver Meadow "	3,571 13	107,694 13
" " Mahanoy "	98 05	7,677 17
" " Hazleton "	5,853 06	165,251 12
" " Upper Lehigh "	930 12	20,524 19
" " Wyoming "	3,115 12	52,043 16
Total	21,124 15	527,021 15
Corresponding week last year	33,187 09	413,172 07
Increase	.....	113,849 08
Decrease	12,062 14	

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK. September 20. R. A.	W. A.	AT PHILADELPHIA. September 20. R. A.	W. A.
SCHUYLKILL.				
Lump	$—	$—	—	—
Steamer,	—	—	—	—
Broken,	—	—	—	—
Egg	5 25	4 75	—	—
Stove,	5 50	5 00	—	—
Chestnut,	4 25	—	—	—
Pea	—	—	—	—
LEHIGH.				
Lump, (along side)	5 35	—	—	—
Broken	4 60	—	—	—
Egg	4 60	—	—	—
Stove	4 85	—	—	—
Chestnut	4 35	—	—	—
Pea	—	—	—	—
SPECIAL COALS *				
Honey Brook, Le'h W. A.	4 00@5 00		—	—
Spring Mountain " "	—@—		—	—
Sugar Creek " "	—@—		—	—
Sugar Loaf " "	—@—		—	—
Old Comp'ny's " "	4 00@5 15		—	—
Room Run " "	4 00@4 50		—	—
McNeal " "	—		—	—
Girardville " "	—		—	—
Hill & Harris " "	—		3 10@4 00	—
Shamokin " "	—		—	—
Lykens Valley " "	—		—	—
Broad Top " "	—		—	—
McMichael " "	—		3 25@4 25	—
Henry Clay " "	—		—	—
Powelton " "	—		—	—

Company Coals.

September, 1872.

	L.	Str.	Gra.	Eg.	Sto	Chest
*Scranton at E. Port	3 45	3 45	3 65	3 70	4 00	3 50
*Pittston at Newburg	3 80	3 80	3 80	3 80	4 00	3 80
*Lackawana at Weehawken	3 50	3 53	3 50	3 70	4 00	3 60
Wilk'b're at Hoboken	3 60	3 65	3 85	3 85	4 10	3 60
Old Co. Lehigh at PtJohn'n	5 25	—	4 50	4 50	4 60	4 00
Lehigh at Eliz. Port	5 00	—	4 25	4 25	4 50	4 00

For freights to different points see "Freights."
To contractors only.

Prices at Baltimore—September, 1872.

Wholesale Prices to Trade.

Wilksbarre, by cargo or car load	$4 60@4 85
Pittston and Plymouth, do	4 60
Shamokin Red or White Ash, do	4 75
Lykens Valley Red Ash, do	5 50
Zerba Valley	
Treverton	
By retail, all kinds per ton of 2,240 lbs	6 50@7 50
George's Creek and Cumberland f. o. b. at Locust Point for cargoes	4 60@4 65
Fairmont and Clarksburg gas f. o. b. at L. Point	6 00
BITUMINOUS COALS.	
Kittaning Coal Co.'s Phœnix Vein, f. o. b. at Phila	$
Lemon " " "	
Cumberland Vein Coal	
Consolidation Coal Co.'s on board N. Y.	
Maryland Coal Co "	

Prices at Georgetown, D.C., and Alexandria, Va.

September, 1872.

George's Creek and Cumberland f. o. b. for shipping	$4 25@4 35

Prices at Havre de Grace, Md.

September, 1872.

Wilkesbarre and other White Ash for Cargoes	$4 25@4 50
Lykens Valley	@5 50
Shamokin Red or White Ash	4 25@4 50

Bituminous Coals (Cumberland).

Georgetown, F.o.b	$4.25
Baltimore	4.50
New York	6.60

Prices of Gas Coals.

September, 1872.

PROVINCIAL.

Corrected weekly by Louis J. Belloni, Jr., 41-43 Pine st., N. Y.

	Coarse	Slack.
Block House	$1 60	$— 75
Gowrie	1 60	— 75

Vessels are being chartered at $3 00 to $3 25.

Corrected by Bird, Perkins & Job, 27 South street.

	Coarse.	Culm of Coal.
Pictou	$2 25	1 25
Sydney	2 25	- 80
Lingan	1 60	- 80
Caledonia	1 60	- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty on all slack coal or Culm : 40c. per ton of 28 bushels, 80 pounds to the bushel. On all bituminous coal or shale: 75 cents per ton of 28 bushels.

AMERICAN.

	Currency.
Westmoreland	$7 10 @—
Fairmount Gas Coal Co. of N. Y.	7 03 @—
Despard Coal Co	7 00 @—
Penn	7 10 @—
Newburg Orrel Gas	— @—
West Fairmount Gas Coal	7 00 @—
AT PHILADELPHIA.	
Westmoreland	6 00 @—

Prices of Foreign Coals.

September, 1872.
Duty 75 c. per ton.

Corrected weekly by ALFRED PARMELE, No. 32 Pine street, N. Y.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	12 00@13 00
" House "	19 00@20 00
" Orrel	14 00@16 00
Per ton 2,240 lbs., ex-ship.	
PRICES FROM YARD.	
Liverpool House Orrel, screened	$14 00@16 00
"Cannel, "	19 00@23 00
Per ton 2.000 lbs. delivered.	

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption ($1 85 less 55c drawback)	$1 30
For reshipment	1 75

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 66
C. R. R., N. J., Phillipsburgh to Elizabethport	0 98
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$1 99

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 66
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	0 98
Shipping expenses	25
Wharfage	
Total	$1 99

TO HOBOKEN

L. V. R. R., Mauch Chunk to Phillipsburgh	66
Morris & Essex R. R. Phillipsburgh to Hoboken	0 98
Shipping expenses	25
Wharfage	10
Total	$1 99

TO SOUTH AMBOY.

L. V. R. R.	66
B. & D. R. R.	98
Cam. & Am. R. R.	
Shipping Expenses	3
Total	$ 199

PENN HAVEN TO ELIZABETHPORT.

L. V. R R. Penn Haven to Phillipsburgh	0 7
C. RR. of N. J. Phillipsburgh to Elizabethport	0 98
Shipping expenses	25
Wharfage	10
Total	$2 11

Freights.—September, 1872.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore	Anthracite. From Philad'a.	Anthracite. From Elz. Port, Port Johnston, and Hoboken.	Anthracite. From Newburgh.	Anthracite. From Rondout.
Amesbury		2 80		1 75	2 00	
Bangor		2 80				
Bath		2 80				
Boston	2 50	2 65		1 75	2 00	
Bridgeport	2 25	2 30		1 00	1 20	
Bristol				1 40	1 60	
Cohasset Narrows						
Derby				1 25	1 35	
Dighton	2 35				1 65	
East Cambridge				1 75	2 00	
Fall River	2 25	2 50		1 40	1 60	
Hackensack						
Hartford		3 00		1 60		
Hoboken	1 90			50		
Jersey City	1 90			50		
Lynn					2 00	
Middletown				1 30		
Mystic	2 60	2 75		1 30	1 35	
New Bedford	2 35	2 75		1 45		
Newburyport		2 90		1 90	2 30	
New Haven	2 25	2 30		1 00	1 20	
New London		2 35		1 20	1 35	
Newport	2 25	1 90		1 40	1 60	
New York	2 05	1 90		50	60	
Norwalk	2 50	2 50		1 00	1 20	
Norwich	2 35	2 50		1 30	1 45	
Pawtucket	2 80	2 70		1 50	1 70	
Portland	2 60	2 75		1 75		
Portsmouth, N. H	2 65	2 90		1 95	2 10	
Providence	2 25	2 50		1 40	1 60	
Rockport						
Saco						
Sag Harbor	2 85	3 00		1 30	1 40	
Salem		2 65		1 75	2 10	
Stamford				1 00	1 15	
Stonington				1 35	1 35	
Taunton				1 90		
Warren				1 40	1 65	
TO RIVER PORTS						
Albany	3 00	2 40				
Catskill						
Cocksackie						
Coeyman's						
Cold Spring	2 30	2 25				
Fishkill						
Haverstraw	2					
Hudson	2 30	2 30				
New York						
Nyack	2 25					
Poughkeepsie	2 25					
Rhinebeck						
Rondout						
Saugerties						
Sing Sing						
Stuyvesant						
Tarrytown						
Troy	3 00	2 50				
West Point						
Yonkers						

Foreign and Provincial Freights.

September 1872.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-5 tons £
Liverpool, 5 per cent primage

TO NEW YORK.

Provincial.	
Sydney	$3 05
Lingan	3 50
Cow Bay	3 75
Port Caledonia	3 10
Little Glace Bay	3 00

TO BOSTON.

Sydney	3 00
Lingan	3 00
Cow Bay	3 00
Port Caledonia	3 00
Little Glace Bay	2 90

MARKET REVIEW.

NEW YORK, Sept. 18, 1872.

IRON—The market for Scotch Pig continues firm, but there are few transactions to note. Prices for the several brands have reached such high figures, while telegrams from the other side quote still further advances on Glengarnock and Coltness of 1s. to 2s., and on Monckland and Clyde 3s. per ton, that consumers only purchase for actual wants. The stocks of all brands are concentrated in few hands, and holders are very firm, as it is known that but little is on the way, and shipments are likely to be light for some time to come, prices ruling here being below cost of importation. Some holders are not offering their stocks, feeling confident that values here must ultimately advance to prices more nearly approximating the cost on the other side. We understand, however, that there are one or two outside lots on the market which have been offered at less than our quotations, by parties desiring to realize. Some consumers are agitating the question of laying in stocks for next year at the present rates, and we understand that, to some extent it has been done. The stock of Eglinton has been reduced to a low figure, and is now held at $52.50a53. Coltness, with a small stock (none afloat), is selling from yard at $59a60. We quote Glengarnock $54a55, and Gartsherrie $56a57; but these figures are nominal. The sales are 100a200 tons Eglinton at $51a51,50 and 100 tons Monckland on private terms. American continues very firm, and sales for future delivery are made at full rates. We hear of further contracts, besides those mentioned in our recent issues, 1000 tons No. 1 Thomas, for delivery from February to June next year, at $55; and a considerable quantity of No.1 and 2 Crane, for future delivery, the particulars of which we did not learn. Rails are quite at $74a76 for New English, while Old are dull and weak at $48a49 for T. D. H., both gold; sales have been made of 2000 tons New at $75 gold; 400 tons do. 30lbs., on terms not made public; 1000 tons Old, part to arrive, $49 gold; and 30 tons do., $55,50 currency. New American may be quoted at $85a90, without sales. Scrap is dull and irregular; we quote from dock, nominal, $47a48, and from yard $50a62, with sales of 1150 tons, part ex ship and to arrive, at $46a50. Refined Bar continues firm at our quotations. Russia Sheet has been in some demand, the sales being 350 packs part at 17½ cents gold for Sound. Common Sheets are steady and firm at our quotations.

PHILADELPHIA, September 16.—(From a Circular of Edward Samuel.)—American Pig is firm with apparently no chance of downward movement for some time to come. Sales of 2500 tons Allentown are reported at $55—at Furnace for number one X delivery from November, 1872, to April, 1873. This is the highest sale of a large lot for the year. New Rails are in demand, but not at remunerative figures. We quote American No. 1 Foundry Pig, at Furnace $53a55; No. 2 $50a52; No. 3 Forge, $46a48; No. 4 White and Mottled, $43a44; American Refined Bar (Mill price), 5½ cents; Common $105a107,50; Rails (at Mill, $87a90.

COPPER—The manufactures of Copper and Yellow Metal are steady at our quoted rates. Ingot has become very quiet again, and we have only to notice small sales of Lake at 33¼a33½ cents, cash.

LEAD—The demand for Pig is limited, and we hear of none but small jobbing lots. Ordinary Foreign may be quoted $6,52½a6,45 gold. Manufactured is steady at old quotations.

SPELTER—Foreign is without demand, though the firm prices in Europe tend to support values here; we quote Silesian nominally 6¾a7 cents gold, as to brand.

STEEL—The market is steady and firm at our quotations.

TIN—While the market for Pig is still very quiet, there is no pressure to sell, and the causes referred to in our last continue to impart confidence to holders. Higher prices are now demanded. For 1000 slabs Straits, now to arrive, now due, 33¾ cents, prompt cash, has been refused. At the close, Straits and English were quoted firm at 33½a33¾ cents, with some holders asking 34; Banca, nominally 40a51 all gold. Large lots of Plates are without demand at the prices now ruling, but there is a moderate jobbing business, and quotations for such parcels are supported.

ZINC—Mosselmann Sheet is steady at former quotations—300 casks sold from Agents' hands for future delivery, at 9½ cents, less 4 per cent. gold. Manganese black oxide is quoted at 4c. currency, do. Pyrolusite 5½c.

The following is the Metal Circular of Messrs. Vivian, Younger & Bond, dated LONDON, August 30, 1872.

Throughout the week the depression in Copper has continued, the uncertainty of the future course of prices has restricted the operations of all classes of buyers, and the market closes flat, without however any further quotable reduction in values. A fair business in Lead and Spelter, but Tin dull and irregular.

COPPER—The market since our last circular has been flat and irregular, with only moderate transactions in Chili Bars, £88 being accepted for Lots, and £89a90 Urmeneta and good ordinary brands. 400 tons Chilian Regulus sold to arrive at 19s. per unit. In Fine Foreign sales of Wallaroo £101 cash and one month, down to £98 a£88 10s. cash, Burra £98 10s. On the 27th inst. the English smelters reduced their official quotations £7 per ton on Manufactured, and £8 per ton on Unmanufactured, making the price for Sheets £110, Best Selected £105, and Tough Cake £103. Such a wide margin having already existed between the market prices and those of the smelters, this reduction was of no real importance as indicting any sudden or unexpected change. On the 28th inst. telegraph advices from Chili announced charters of 1900 tons Fine, 1040 tons being in Bars and Ingots, and 860 tons in Ores and Regulus. The actual exports from the West Coast for the first six months of this year as compared with the same period of 1871, represent an increase of 6000 tons in Fine Copper, and the quantity exported afloat and chartered for to the 17th July an increase of 8500 tons Fine, but it is expected that the shipments to December next will be on a much more moderate scale.

TIN—A dull market, with only a moderate business in Straits at 147s. cash and one month, to 145s. cash. English in fair demand at slightly under quotations.

TIN PLATES—Orders are getting scarcer, though makers as a rule keep to their prices.

IRON—No change.

SPELTER—The second hand parcels of Silesian being taken from the market, prices are firm, with a better inquiry.

LEAD—Makers are firm at £2 5s., having taken considerable orders up to £20 2s. 6d. Spanish firm, without much business.

METALS.

NEW YORK, September 18, 1872.

IRON.—Duty: Bars, 1 to 1½ cents ℔ lb; Railroad, 70 cents ℔100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1½ cents ℔ lb; Pig, $7℔ ton; Polished Sheet, 3 cts. ℔ lb; Galvanized 2½; Scrap Cast, $6; Scrap Wrought, $8 per ton. All less 10 per cent. No Bar Iron to pay a less duty than 35 per cent. ad val.

	Store Prices.
Pig, Scotch—Coltness ℔ ton	59 00@60 00
Gartsherrie	56 00@57 00
Glengarnock	54 50@55 00
Eglinton	52 00@53 00
Pig, American, No. 1	55 00@57 00
Pig, American, No. 2	53 00@54 00
Pig, American, Forge	48 00@49 00
Bar Refined, English and American	115 00@120 00
Bar Swedes, assorted sizes gold	120 00@130 00
	Store Prices, Cash.
Bar, Swedes, 1¾ to 5 x ⅞ & ⅞ 2 sq. & 6 to 12 x ¾ & ½	145 00@155 00
Bar, Refined, ¾ to 2 in. rd. & sq. 1 to 6 in. x ⅜ to 1 in.	— —@120 00
Bar, Refined, 1¼ to 6 by ¼	125 00@— —
Bar, Refined, 2½ to 2⅞ round 1 & 1½ by ¼ & 5:16	127 50@— —
Large Rounds	127 50@140 00
Scroll	140 00@170 00
Ovals and half-round	140 00@160 00
Bands	— —@135 00
Horse Shoe	130 00@140 00
Rods, ⅜ to 3-16 inch	125 00@165 00
Hoop	145 00@190 00
Nailrod	@ 9
Sheet, Russia, as to assortment (gold)	17½@— —
Sheet, Singles, D. and T. Common	—7½@— 8½
Sheet, D. and T. Charcoal	—7¾@— 8½
Sheet, Galv'd, list 10 per cent discount	—@— —
Rails, English (gold), ℔ ton	74 00@ 76 00
Rails, American, at Works in Pennsylvania, currency	85 00@ 90 00

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ℔ lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ℔ lb	—@— 43
Copper Bolts	—@— 45
Copper Braziers, 16oz. and over	—@— 45
Copper Nails	—@— 45
Copper, Old Sheathing, &c. mixed lots	26 @— 28
Copper, Old, for chemical purposes, 14@16 oz.	—@— —
Copper English Pig	32½@— —
Copper, American Ingot	33¼@— 33½
Yellow Metal, New Sheathing & Bronze	—@— 30
Yellow Metal Bolts	—@— 32
Yellow Metal Nails	30 @— 32

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb; Pipe and Sheet, 2¾ cents ℔ lb.

Galena, ℔ 100 lbs	$— —@— —
Spanish (gold)	— —@6 45
German, do.	— —@6 45
English do.	6 50 @7 00
Bar (net)	9 25 @— —
Pipe (net)	— —@11 00
Sheet	— —@11 00

Colwell, Shaw & Willard Tin-Lined Lead Pipe 16½ cts. ℔ lb.

STEEL.—Duty: Bars and Ingots, valued at 7 cents ℔ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 3½ cents ℔ lb, and 10 ℔ cent ad val. Store prices.

English Cast (2d and 1st quality) ℔ lb	— 16½@— 20
English Spring (2d and 1st quality)	— 9½@— 10½
English Blister (2d and 1st quality)	— 11¾@— 16
English Machinery	— 11½@— 13½
English German (2d and 1st quality)	— 11¼@— 12
American Blister "Black Diamond"	— —@— 11½
American, Cast, Tool do.	— —@— 17
American, Spring, do.	— —@— 11
American Machinery do.	— —@— 11½
American German, do.	— 9 @— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent.; Roofing 25. ad val.

	Gold ℔ lb.
Banca	40 @41
Straits	33 @33¾
English	— @33½

PLATES.

Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ℔ box	$13 25 @13 50	$15 25 @15 50
I.C. Coke	12 00 @12 50	14 25 @14 50
Coke Terne	10 75 @11 25	12 25 @12 75
Charcoal Terne	11 50 @12 00	13 25 @13 75

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign (gold) p. 100 lb.	6 75 @ 7 00
Plates, Domestic p. lb.	8¾@— 11

ZINC—Duty: Pig or Block, $1.50 per 100 lb.; Sheet 2½c. per ℔ lb

Sheet per lb.	— 10½@ 11

San Francisco Stock Market.

BY TELEGRAPH.

NEW YORK, Sept. 19, 1872.

We have advices from the San Francisco Stock Board, dated the 17 inst. with the exception of an advance in Gould & Curry of $40 per share the market has declined, Savage figuring most prominently in the downward tendencies being $17 lower than per our last report. The quotations are as follows:

	Sept. 17.	
Savage	— 114	—
Crown Point	— 173	—
Yellow Jacket	— 108	—
Kentuck	— 250	—
Chollar Potosi	— 66	—
Gould & Curry	— 172	—
Belcher "New Issue"	— 105	—
Imperial	— 8½	—
Hale & Norcross	— —	—
Eureka G. V.	— —	—

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. The dues for the year ending May, 1873, are now payable. All members and Associates who have not paid their dues are requested to do so at once, by sending in postal orders, or checks, or money, ten dollars to the Secretary.

All members and Associates who pay their dues for each current year, strictly in advance, will have sent to their address, regularly and weekly, the ENGINEERING AND MINING JOURNAL, which is the organ of the Institute, and will contain the proceedings and transactions, and all important papers read before the Institute and all notices of meetings. Back numbers cannot, as a general rule, be sent.

II. It is expected that the more important papers read before the Institute, and the debates thereon, will be published in annual or occasional volumes to which those Members and Associates will be entitled who have paid their dues.

III. All authors of papers are requested to notify the Secretary in advance of the meetings, giving the subject and length of their papers. Attention is also called, in this connection, to Rules 12 and 13.

IV. The ninth rule has been amended, so that there will be hereafter three meetings a year, in February, May and October. The meeting next October will be held at Pittsburgh, Pa.

Wilkesbarre, Pa. MARTIN CORYELL, Secretary.

106th Auction Sale.

75,000

TONS SCRANTON COAL.

On WEDNESDAY, SEP. 25th, 1872.

NEW YORK, September 18, 1872.

The Delaware, Lackawanna and Western Railroad Company will sell, by MESSRS. JOHN H. DRAPER & CO., Auctioneers, at the Company's Sales Room, 26 EXCHANGE PLACE, corner of William Street, NEW YORK, on WEDNESDAY, September 25, at 12 o'clock, noon,

75,000 TONS

OF

COAL, FROM THE LACKAWANNA REGIONS,

of the usual sizes, deliverable at their Depot, Elizabethport, N. J., during the month of October, 1872.

The sale will be positive; each lot put up will be sold to the highest bidder; no bids, in any form whatever, being made for account of, or on behalf of the Company. The conditions will be fully made known at the time of sale.

TERMS: FIFTY CENTS PER TON, payable in current funds, on the day of sale, and the balance within ten days thereafter, if required, at the office of the Company,

SAMUEL SLOAN, *President.*

LEHIGH UNIVERSITY,

Bethlehem, Penn.

FOUNDED BY HON. ASA PACKER.

DEPARTMENT OF MINING AND METALLURGY.

Instruction in all branches necessary to the degree of Mining Engineer. Any student who wishes to pursue special studies, without taking a degree, may take a partial course. Tuition free.

The position of this institution in the midst of the iron mines and furnaces of the Lehigh Valley, in the neighborhood of the mines and smelting works of the Lehigh Zinc Co., and within easy reach of the Anthracite Coal fields of Pennsylvania, enables it to offer its students unusual facilities for the practical study of coal mining and the mining and metallurgy of iron and zinc.

For further information address

B. W. FRAZIER,

Professor of Mining and Metallurgy.

Statement of Coal Transported over Cumberland and Pennsylvania Railroad

During the week ending Saturday Sept. 14, and during the year 1872, compared with the corresponding period of 1871.

WEEK.

	To C. & O. Canal Tons. Cwt.	To B. & O. R.R. Co. Tons. Cwt.	Total. Tons Cwt.
1872	15,307 12	22,394 03	37,701 15
1871	14,506 18	24,627 05	39,134 03
Increase	800 14		
Decrease		2,233 02	1,432 08

YEAR.

1872	452,785 01	875,288 06	1,328,073 07
1871	480,881 13	879,559 03	1,360,440 16
Increase	....		
Decrease	28,096 12	4,270 17	32,367 09

Cumberland Branch R. R.

WEEK.

	To C. & O. Canal. Tons. Cwt.	To P. & O. R.R. Co Tons. Cwt.	Total. Tons. Cwt.
1872	5 411 14	268 04	5,679 18
1871	5,594 02	1,913 16	7,507 18
Increase	.....		
Decrease	182 08	1,645 12	1 828 00

YEAR.

1872	154,254 11	12,986 19	167,241 10
1871	142,199 06	51,679 07	193,878 13
Increase	12,055 05		
Decrease		38,692 08	26,637 03

Penn. and N. Y. R. R.—Coxton, Pa.

Coal tonnage for week ending September 14, 1872.:

	Week. Tons. Cwt.	Total. Tons. Cwt.
Anthracite received:		
From Lehigh Valley R. R.	8,089 14	278,556 03
" Lack. & B. R. R.	739 08	60,876 09
" Pleasant Valley R. R.	360 14	73,540 07
" Sul. & Erie R. R.	1,113 13	39,137 17
Total	10,303 09	452,110 16
Distributed:		
To Lehigh Valley R. R.	....	30,610 06
To Lack. & B. R. R.		1,017 17
To S. Central R. R.	2,254 06	81,686 12
To Ithaca & A. R. R.	428 04	73,376 16
To Erie R. W. Pockets for shipm't.	6,039 10	205,443 13
To individuals on line of road	477 01	15,455 02
To points at & above Coxton for use of Co.	89 12	18,318 00
To points between Waverley and Elmira	1,014 16	26,202 10
Total	10,303 09	452,110 16
Bituminous received from BARCLAY R. R.		
Shipped north from Towanda	6,036 12	267,617 10
Shipped south from Towanda	20 03	1,975 11
Northern Central R R	.....	170 10
Total	6,056 15	269,763 11
Distributed:		
To Erie Railway	5,267 05	241,065 17
To So. Central R. R.	769 07	26,364 08
To Ithaca Valley R. R.		57 05
Lehigh Valley, R. R.	13 05	1,158 07
To individuals on line of Railroad.	6 18	862 10
To points on line of road for use of Company	....	255 04
Total	6,056 15	269,763 11
Grand totals transported:		
Anthracite	10,303 09	452,110 16
Bituminous	6,056 15	269,763 11
Total	16 360 04	721,874 07

Lehigh Coal and Navigation Company,

Report of Coal transported over the Lehigh Canal and L. & S. Div of Central Railroad of New Jersey for the week ending Sept. 14, 1872, and for the year 1872.

	WEEK.	YEAR.
Forwarded East of M'ch Chunk by Rail	31,792 13	1,223,606 18
Delivered at and above do.,	1,069 04	41,019 07
Forwarded East of do., by Canal	21,124 15	527,021 15
	53,986 12	1,791,648 00
Corresponding period last year—		
Forwarded East of M. Chunk by Rail..	29,972 12	820,083 17
Delivered at and above do.,	1,097 17	41,197 00
Forwarded East of do., by Canal	33,187 09	413,172 07
	64,257 18	1,274,453 04
Increase on Railroad	1,791 08	403,345 08
Decrease " "	.....	
Increase on Canal	.....	113,849 08
Decrease " "	12,062 14	

Of the above there was transported on account of—

Lehigh Coal Nav. Co.	24,360 08	661,776 01
Wilkesbarre Coal & Iron Co.	17,146 02	703,493 17
	41,506 10	1,365,269 18
Corresponding period last year—		
Lehigh Coal & Nav. Co	19,286 09	353,098 08
Wilkesbarre Coal & Iron Co.	16,731 09	593,532 15
	36,017 18	946,631 03
Increase	5,488 12	388,638 15

Schuylkill Canal.

Report of coal transported over the Schuylkill Canal for the week ending Saturday, September 14, 1872.

	Tons. Cwt.
From Schuylkill Haven	20,812 00
" Port Clinton	1,047 00
Total for week	21,859 00
Previously this year	562,156 15
Total	584,015 15
To same time last year	688,977 12

Northern Central Railway, Shamokin Division.

Below is the return of Coal sent over the Shamokin Division of the N. C. R. W., for the week ending September 14, 1872.

	Tons. Cwt.	
East	1,761 17	
West	8,906 00	
		10,667 17
Same time last year		10,705 09
Increase		
Decrease		37 12
Total amount shipped to date		385,314 11
Same time last year		452,243 08
Decrease		66,928 17

Delaware Lackawanna & Western Rail Road Company.

Coal transported on the Delaware, Lackawanna, & Western Railroad for the week ending Saturday, Sept. 14, 1872.

	WEEK. Tons. Cwt.	YEAR. Tons. Cwt.
Shipped North	21,308 14	512,642 18
Shipped South	38,085 10	1,509 388 10
Total	58,394 04	2,022,031 08
For the Corresponding time last Year:		
Shipped North	19,907 06	316,232 01
Shipped South	43,515 02	706,652 08
Total	63,422 08	1,022,884 10
Increase		999,146 18
Decrease	5,028 04	

Lehigh Canal Coal Trade.

Shipped for the week ending September 13, 1872.

		Week. Tons. Cwt.	Week. Tons. Cwt.
Total from Mauch Chunk Region		7,555 07	173,828 18
" " Beaver Meadow	"	3,571 13	107,694 13
" " Mahanoy	"	98 05	7,677 17
" " Hazleton	"	5,853 06	165,251 12
" " Upper Lehigh	"	930 12	20,524 19
" " Wyoming	"	3,115 12	52,043 16
Total		21,124 15	527,021 15
Corresponding week last year		33,187 09	413,172 07
Increase		.....	113,849 08
Decrease		12,062 14	

Prices of Coal by the Cargo.

[CORRECTED WEEKLY.]

	AT NEW YORK, September 20.		AT PHILADELPHIA. September 20.	
SCHUYLKILL.	R. A.	W. A.	R. A.	W. A.
Lump	$—	$—	— —	— —
Steamer	— —	— —	— —	— —
Broken	— —	— —	— —	— —
Egg	5 25	4 75	— —	— —
Stove	5 50	5 00	— —	— —
Chestnut	4 25	—	— —	— —
Pea	— —	— —	— —	— —
LEHIGH.				
Lump, (along side)	5 35	—	— —	— —
Broken	4 60	— —	— —	— —
Egg	4 60	— —	— —	— —
Stove	4 85	— —	— —	— —
Chestnut	4 35	— —	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS				
Honey Brook, Le'h W. A.	4 00@5 00		— —	— —
Spring Mountain " "	— —@— —		— —	— —
Sugar Creek " "	— —@— —		— —	— —
Sugar Loaf " "	— —@— —		— —	— —
Old Comp'y's " "	4 00@5 15		— —	— —
Room Run " "	4 00@4 50		— —	— —
McNeal " "	— —		— —	— —
Girardville " "	— —		— —	— —
Hill & Harris " "	— —		3 10@4 00	— —
Shamokin " "	— —		— —	— —
Lykens Valley " "	— —		— —	— —
Broad Top " "	— —		— —	— —
McMichael " "	— —		3 25@4 25	— —
Henry Clay " "	— —		— —	— —
Powelton "	— —		— —	— —

Company Coals.

September, 1872.

	L.	Str.	Gas	Eg.	Sto	Chest
*Scranton at E. Port	3 45	3 45	3 65	3 70	4 00	3 50
*Pittston at Newburg	3 80	3 80	3 80	3 80	4 00	3 80
*Lackawana at Weehawken	3 50	3 53	3 50	3 70	4 00	3 60
Wilk'b're at Hoboken	3 60	3 65	3 85	3 85	4 10	3 60
Old Co. Lehigh at Pt John'n	5 25	—	4 50	4 50	4 60	4 60
Lehigh at Eliz. Port	5 00	—	4 25	4 25	4 50	4 00

For freights to different points see "Freights."

To contractors only.

Prices at Baltimore—September, 1872.

Wholesale Prices to Trade.

Wilksbarre, by cargo or car load	$4 60@4 85
Pittston and Plymouth, do	4 60
Shamokin Red or White Ash, do	4 75
Lykens Valley Red Ash, do	5 50
Zerba Valley	
Treverton	
By retail, all kinds per ton of 2,240 lbs	6 50@7 50
George's Creek and Cumberland f. o. b. at Locust Point for cargoes	4 60@4 65
Fairmont and Clarksburg gas f. o. b. at L. Point	6 00
BITUMINOUS COALS.	
Kittaning Coal Co.'s Phœnix Vein, f. o. b. at Phila	$
Lemon " " "	
Cumberland Vein Coal	
Consolidation Coal Co.'s on board	N. Y.
Maryland Coal Co	"

Prices at Georgetown, D.C., and Alexandria, Va.

September, 1872.

George's Creek and Cumberland f. o. b. for shipping $4 25@4 35

Prices at Havre de Grace, Md.

September, 1872.

Wilkesbarre and other White Ash for Cargoes	$4 25@4 50
Lykens Valley	@5 50
Shamokin Red or White Ash	4 25@4 50

Bituminous Coals (Cumberland).

Georgetown, F.o.b.	$4.25
Baltimore	4.50
New York	6.60

Prices of Gas Coals.

September, 1872.

PROVINCIAL.

Corrected weekly by Louis J. Beiloni, Jr., 41-43 Pine st., N. Y

	Coarse	Slack.
Block House	$1 60	$— 75
Gowrie	1 60	— 75

Vessels are being chartered at $3 00 to $3 25.

Corrected by Bird, Perkins & Job, 27 South street.

	Coarse.	Culm of Coal.
Picton	$2 25	1 25
Sydney	2 25	- 80
Langan	1 60	- 80
Caledonia	1 60	- 80

A discount from the prices of the coarse Coal on purchase of 5000 tons and upwards. Duty on all slack coal or Culm: 40c. per ton of 28 bushels, 80 pounds to the bushel. On all bituminous coal or shale: 75 cents per ton of 28 bushels.

AMERICAN.

	Currency.
Westmoreland	$7 10 @— —
Fairmount Gas Coal Co. of N. Y.	7 00 @— —
Despard Coal Co	7 00 @— —
Penn	7 10 @— —
Newburg Orrel Gas	— — @— —
West Fairmount Gas Coal	7 00 @— —
AT PHILADELPHIA.	
Westmoreland	6 00 @— —

Prices of Foreign Coals.

September, 1872.

Duty 75 c. per ton.

Corrected weekly by ALFRED PARMELE, No. 32 Pine street, N. Y.

Liverpool Gas Caking	$ 8 00@— —
" " Cannel	12 00@13 00
" House "	19 00@20 00
" Orrel	14 00@15 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$14 00@16 00
"Cannel, "	19 00@23 00

Per ton 2.000 lbs. delivered.

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven for consumption ($1 85 less 55c drawback	$1 30
For reshipment	1 75

MAUCH CHUNK TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Phillipsburgh	$0 66
C. R. R., N. J., Phillipsburgh to Elizabethport	0 98
Shipping expenses at Elizabethport	25
Wharfage	10
Total	$1 9

MAUCH CHUNK TO PORT JOHNSON.

L. V. R.R., or L. & S. R.R. from M. C. to Phillipsb'g	$0 66
C. R. R., of N. J., Phillipsburgh to Pt. Johnson	0 98
Shipping expenses	25
Wharfage	10
Total	$1 99

TO HOBOKEN

L. V. R. R., Mauch Chunk to Phillipsburgh	66
Morris & Essex R. R. Phillipsburgh to Hoboken,	0 98
Shipping expenses	25
Wharfage	10
Total	$1 99

TO SOUTH AMBOY.

L. V. R. R.	66
B. & D. R. R. } Cam. & Am. R. R. }	98
Shipping Expenses,	35
Total	$ 199

PENN HAVEN TO ELIZABETHPORT.

L. V. R R. Penn Haven to Phillipsburgh	0 7
C. RR. of N. J. Phillipsburgh to Elizabethport	0 98
Shipping expenses	25
Wharfage	10
Total	$2 11

Freights.—September, 1872.

TO EASTERN PORTS.	Cumberland. From Georgetown.	Cumberland. From Baltimore	Anthracite. From Philada.	Anthracite. From Elizabethport, Port Johnston, and Hoboken.	Anthracite. From Newburgh.	Anthracite. From Rondout.
Amesbury		2 80		1 75	2 00	
Bangor		2 80				
Bath		2 80		1 75	2 00	
Boston	2 50	2 65		1 00	1 20	
Bridgeport	2 25	2 30		1 40	1 60	
Bristol						
CohassetNar'ows				1 25	1 35	
Derby					1 65	
Dighton	2 35			1 75	2 00	
East Cambridge				1 40	1 60	
Fall River	2 25	2 50				
Hackensack				1 60		
Hartford		3 00		50		
Hoboken	1 90			50		
Jersey City	1 90				2 00	
Lynn				1 30		
Middletown				1 30	1 35	
Mystic	2 60	2 75		1 45		
New Bedford	2 35	2 75		1 90	2 30	
Newburyport		2 90		1 00	1 20	
New Haven	2 25	2 30		1 20	1 35	
New London		2 35		1 40	1 60	
Newport	2 25	1 90		50	60	
New York	2 05	1 90		1 00	1 20	
Norwalk	2 50	2 50		1 30	1 45	
Norwich	2 35	2 50		1 50	1 70	
Pawtucket	2 80	2 70		1 75		
Portland	2 60	2 75		1 95	2 10	
Portsmouth, N. H	2 65	2 90		1 40	1 60	
Providence	2 25	2 50				
Rockport						
Saco				1 30	1 40	
Sag Harbor	2 85	3 00		1 75	2 10	
Salem		2 65		1 00	1 15	
Stamford				1 35	1 35	
Stonington				1 90		
Taunton				1 40	1 65	
Warren						
TO RIVER PORTS						
Albany	3 00	2 40				
Catskill						
Cocksackie						
Coeyman's						
Cold Spring	2 30	2 25				
Fishkill						
Haverstraw	2					
Hudson	2 30	2 30				
New York						
Nyack	2 25					
Poughkeepsie	2 25					
Rhinebeck						
Rondout						
Saugerties						
Sing Sing						
Stuyvesant						
Tarrytown						
Troy	3 00	2 50				
West Point						
Yonkers						

Foreign and Provincial Freights.

September 1872.

Foreign.

Newcastle and Ports on Tyne, per keel of 21 1-3 tons £

Liverpool, 5 per cent primage

TO NEW YORK.

Provincial.

Sydney	$3 05
Lingan	3 50
Cow Bay	3 75
Port Caledonia	3 10
Little Glace Bay	3 00

TO BOSTON.

Sydney	3 00
Lingan	3 00
Cow Bay	3 00
Port Caledonia	3 00
Little Glace Bay	2 90

MARKET REVIEW.

NEW YORK, Sept. 18, 1872.

IRON—The market for Scotch Pig continues firm, but there are few transactions to note. Prices for the several brands have reached such high figures, while telegrams from the other side quote still further advances on Glengarnock and Coltness of 1s. to 2s., and on Monckland and Clyde 3s. per ton, that consumers only purchase for actual wants. The stocks of all brands are concentrated in few hands, and holders are very firm, as it is known that but little is on the way, and shipments are likely to be light for some time to come, prices ruling here being below cost of importation. Some holders are not offering their stocks, feeling confident that values here must ultimately advance to prices more nearly approximating the cost on the other side. We understand, however, that there are one or two outside lots on the market which have been offered at less than our quotations, by parties desiring to realize. Some consumers are agitating the question of laying in stocks for next year at the present rates, and we understand that, to some extent it has been done. The stock of Eglinton has been reduced to a low figure, and is now held at $52.50a53. Coltness, with a small stock (none afloat), is selling from yard at $59a60. We quote Glengarnock $54a55, and Gartsherrie $56a57; but these figures are nominal. The sales are 100a200 tons Eglinton at $51a51,50 and 100 tons Monckland on private terms. American continues very firm, and sales for future delivery are made at full rates. We hear of further contracts, besides those mentioned in our recent issues, 1000 tons No. 1 Thomas, for delivery from February to June next year, at $55; and a considerable quantity of No.1 and 2 Crane, for future delivery, the particulars of which we did not learn. Rails are quite at $74a76 for New English, while Old are dull and weak at $48a49 for T. D. H., both gold; sales have been made of 2000 tons New at $75 gold; 400 tons do. 30lbs., on terms not made public; 1000 tons Old, part to arrive, $49 gold; and 30 tons do., $55,50 currency. New American may be quoted at $85a90, without sales. Scrap is dull and irregular; we quote from dock, nominal, $47a48, and from yard $50a62, with sales of 1150 tons, part ex ship and to arrive, at $46a50. Refined Bar continues firm at our quotations. Russia Sheet has been in some demand, the sales being 350 packs part at 17½ cents gold for Sound. Common Sheets are steady and firm at our quotations.

PHILADELPHIA, September 16.—(From a Circular of Edward Samuel.)—American Pig is firm with apparently no chance of downward movement for some time to come. Sales of 2500 tons Allentown are reported at $55—at Furnace for number one X delivery from November, 1872, to April, 1873. This is the highest sale of a large lot for the year. New Rails are in demand, but not at remunerative figures. We quote American No. 1 Foundry Pig, at Furnace $53a55; No. 2 $50a52; No. 3 Forge, $46a48; No. 4 White and Mottled, $43a44; American Refined Bar (Mill price), 5½ cents; Common $105a107,50; Rails (at Mill, $87a90,

COPPER—The manufactures of Copper and Yellow Metal are steady at our quoted rates. Ingot has become very quiet again, and we have only to notice small sales of Lake at 33¼a33¾ cents, cash.

LEAD—The demand for Pig is limited, and we hear of none but small jobbing lots. Ordinary Foreign may be quoted $6,52½a6,45 gold. Manufactured is steady at old quotations.

SPELTER—Foreign is without demand, though the firm prices in Europe tend to support values here; we quote Silesian nominally 6¾a7 cents gold, as to brand.

STEEL—The market is steady and firm at our quotations.

TIN—While the market for Pig is still very quiet, there is no pressure to sell, and the causes referred to in our last continue to impart confidence to holders. Higher prices are now demanded. For 1050 slabs Straits, now to arrive, now due, 33¾ cents, prompt cash, has been refused. At the close, Straits and English were quoted firm at 33½a33¾ cents, with some holders asking 34; Banca, nominally 40a51 all gold. Large lots of Plates are without demand at the prices now ruling, but there is a moderate jobbing business, and quotations for such parcels are supported.

ZINC—Mosselmann Sheet is steady at former quotations—300 casks sold from Agents' hands for future delivery, at 9½ cents, less 4 per cent. gold. Manganese black oxide is quoted at 4c. currency, do. Pyrolusite 5½c.

The following is the Metal Circular of Messrs. Vivian, Younger & Bond, dated LONDON, August 30, 1872.

Throughout the week the depression in Copper has continued, the uncertainty of the future course of prices has restricted the operations of all classes of buyers, and the market closes flat, without however any further quotable reduction in values. A fair business in Lead and Spelter, but Tin dull and irregular.

COPPER—The market since our last circular has been flat and irregular, with only moderate transactions in Chili Bars, £88 being accepted for Lots, and £89a90 Urmeneta and good ordinary brands. 400 tons Chilian Regulus sold to arrive at 19s. per unit. In Fine Foreign sales of Wallaroo £101 cash and one month, down to £98 a£88 10s. cash, Burra £98 10s. On the 27th inst. the English smelters reduced their official quotations £7 per ton on Manufactured, and £8 per ton on Unmanufactured, making the price for Sheets £110, Best Selected £105, and Tough Cake £103. Such a wide margin having already existed between the market prices and those of the smelters, this reduction was of no real importance as indicting any sudden or unexpected change. On the 28th inst. telegraph advices from Chili announced charters of 1900 tons Fine, 1040 tons being in Bars and Ingots, and 860 tons in Ores and Regulus. The actual exports from the West Coast for the first six months of this year as compared with the same period of 1871, represent an increase of 6000 tons in Fine Copper, and the quantity exported afloat and chartered for to the 17th July an increase of 8500 tons Fine, but it is expected that the shipments to December next will be on a much more moderate scale.

TIN—A dull market, with only a moderate business in Straits at 147s. cash and one month, to 145s. cash. English in fair demand at slightly under quotations.

TIN PLATES—Orders are getting scarcer, though makers as a rule keep to their prices.

IRON—No change.

SPELTER—The second hand parcels of Silesian being taken from the market, prices are firm, with a better inquiry.

LEAD—Makers are firm at £2 5s., having taken considerable orders up to £20 2s. 6d. Spanish firm, without much business.

METALS.

NEW YORK, September 18, 1872.

IRON.—Duty: Bars, 1 to 1½ cents ₩ lb; Railroad, 70 cents ₩100 lbs.; Boiler and Plate, 1½ cents ₩ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ₩ lb; Pig, $7₩ ton; Polished Sheet, 3 cts. ₩ lb; Galvanized 2½; Scrap Cast, $6; Scrap Wrought, $8 per ton. All less 10 per cent. No Bar Iron to pay a less duty than 35 per cent. ad val.

	Store Prices.
Pig, Scotch—Coltness ₩ ton	59,00@60 00
Gartsherrie	56 00@57 00
Glengarnock	54 50@55 00
Eglinton	52 00@53 00
Pig, American, No. 1	55 00@57 00
Pig, American, No. 2	53 00@54 00
Pig, American, Forge	48 00@49 00
Bar Refined, English and American	115 00@120 00
Bar Swedes, assorted sizes 'gold	120 00@130 00
	Store Prices, Cash.
Bar, Swedes, 1¼ to 5 x ⅜ & ⅞ 2 sq. & 6 to 12 x ¼ & ½	145 00@155 00
Bar, Refined, ¼ to 2 in. rd. & sq. 1 to 6 in. x ¼ to 1 in.	— —@120 00
Bar, Refined, 1¼ to 6 by ¼	125 00@— —
Bar, Refined, 2½ to 2⅞ round 1 & 1⅛ by ¼ & 5:16	127 50@— —
Large Rounds	127 50@140 00
Scroll	140 00@170 00
Ovals and half-round	140 00@160 00
Band	— —@135 00
Horse Shoe	130 00@140 00
Rods, ⅜ to 3-16inch	125 00@165 00
Hoop	145 00@190 00
Nailrod	@ 9
Sheet, Russia, as to assortment (gold)	17½@— —
Sheet, Singles, D. and T. Common	—7½@— 8½
Sheet, D. and T. Charcoal	—7¾@— 8¼
Sheet, Galv'd, list 10 per cent discount	—@— —
Rails, English (gold), ₩ ton	74 00@ 76 00
Rails, American, at Works in Pennsylvania, currency	85,00@ 90 00

COPPER.—Duty: Pig, Bar, and Ingot, 5; old Copper 4 cents ₩lb; Manufactured, 45 per cent. ad val.

	All Cash.
Copper, New Sheathing, ₩ lb	— @— 43
Copper Bolts	— @— 45
Copper Braziers, 16oz. and over	— @— 45
Copper Nails	— @— 45
Copper, Old Sheathing, &c. mixed lots	26 @— 28
Copper, Old, for chemical purposes, 14@16 oz	— @— —
Copper English Pig	32½@— —
Copper, American Ingot	33¼@— 33½
Yellow Metal, New Sheathing & Bronze	— @— 30
Yellow Metal Bolts	— @— 32
Yellow Metal Nails	30 @— 32

LEAD.—Duty: Pig, $2 ₩ 100 lbs.; old Lead, 1¼ cents ₩ lb; Pipe and Sheet, 2¾ cents ₩ lb.

Galena, ₩ 100 lbs	$— —@— —
Spanish (gold)	— —@6 45
German, do.	— —@6 45
English do.	6 50 @7 00
Bar (net)	9 25 @— —
Pipe (net)	— —@11 00
Sheet	— —@11 00

Colwell, Shaw & Willard Tin-Lined Lead Pipe 16½ cts. ₩ lb.

STEEL.—Duty: Bars and Ingots, valued at 7 cents ₩ lb or under, 2¼ cents; over 7 cents and not above 11, 3 cents ₩ lb; over 11 cents, 3½ cents ₩ lb., and 10 ₩ cent ad val. (Store prices.

English Cast (2d and 1st quality) ₩ lb	— 16½@— 20
English Spring (2d and 1st quality)	— 9½@— 10½
English Blister (2d and 1st quality)	— 11¾@— 16
English Machinery	— 11½@— 13¾
English German (2d and 1st quality)	— 11¾@— 12
American Blister "Black Diamond"	— —@— 11½
American, Cast, Tool do.	— —@— 17
American, Spring, do.	— —@— 11
American Machinery do.	— —@— 11½
American German, do.	— 9 @— —

TIN.—Duty: Pig, Bars, and Blocks, 15 ₩ cent. ad val.; Plate and Sheets and Terne Plates, 25 ₩ cent.; Roofing 25. ad val.

	Gold ₩ lb.
Banca	40 @41
Straits	33 @33¾
English	— @33½

PLATES.

Fair to Good Brands.	Gold.	Currency.
I. C. Charcoal, ₩ box	$13 25 @13 50	$15 25 @15 50
I.C. Coke	12 00 @12 50	14 25 @14 50
Coke Terne	10 75 @11 25	12 25 @12 75
Charcoal Terne	11 50 @12 00	13 25 @13 75

SPELTER—Duty: In Pigs, Bars & Plates, $1.50 p. 100 lb

Plates, Foreign (gold)	p. 100 lb.	6 75 @ 7 00
Plates, Domestic	p. lb.	8¾@— 11

ZINC—Duty: Pig or Block, $1.50 per 100 lb.; Sheet 2½c. per lb

Sheet	per lb.— 10½@ 11

San Francisco Stock Market.

BY TELEGRAPH.

NEW YORK, Sept. 19, 1872.

We have advices from the San Francisco Stock Board, dated the 17 inst, with the exception of an advance in Gonld & Curry of $40 per share the market has declined, Savage figuring most prominently in the downward tendencies being $17 lower than per our last report. The quotations are as follows:

	Sept. 17.	
Savage	114	—
Crown Point	1?3	—
Yellow Jacket	108	—
Kentuck	230	—
Chollar Potosi	66	—
Gould & Curry	172	—
Belcher "New Issue"	105	—
Imperial	8½	—
Hale & Norcross	—	—
Eureka C. V.	—	—

American Institute of Mining Engineers.

OFFICIAL BULLETIN.

Announcements to Members and Associates.

I. The dues for the year ending May, 1873, are now payable. All members and Associates who have not paid their dues are requested to do so at once, by sending in postal orders, or checks, or money, ten dollars to the Secretary.

All members and Associates who pay their dues for each current year, strictly in advance, will have sent to their address, regularly and weekly, the ENGINEERING AND MINING JOURNAL, which is the organ of the Institute, and will contain the proceedings and transactions, and all important papers read before the Institute and all notices of meetings. Back numbers cannot, as a general rule, be sent.

II. It is expected that the more important papers read before the Institute, and the debates thereon, will be published in annual or occasional volumes to which those Members and Associates will be entitled who have paid their dues.

III. All authors of papers are requested to notify the Secretary in advance of the meetings, giving the subject and length of their papers. Attention is also called, in this connection, to Rules 12 and 13.

IV. The ninth rule has been amended, so that there will be hereafter three meetings a year, in February, May and October. The meeting next October will be held at Pittsburgh, Pa.

Wilkesbarre, Pa. MARTIN CORYELL, Secretary.

106th Auction Sale.

75,000

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Professor of Mining and Metallurgy.

DEPARTMENT OF POPULAR SCIENCE.

The Scientific Societies.

Scattered through the reports of the foreign and home societies we find a number of papers which afford interesting subjects for experiment or treat of those every day operations of nature, which are obscure because our familiarity with them is so great that we have come to regard them as the normal condition of things rather than as the phenomena which they are. At the British Association, Mr. THOMAS GAFFIELD, of Boston, read a paper on the "Coloration of Glass by the Action of Sunlight." He found that nearly every kind of glass, especially that containing manganese, was liable to change of color by the action of sunlight, and that the glass could be restored to its original color by heat. He argued that in our cathedral windows the glass is not of its original colors, but these colors can be brought back again by heat.

Spheroidal State of Liquids.

MR. W. F. BARRETT, F.C.S., read a paper on "A Condition affecting the Spheroidal State of Liquids, and its possible Relationship to Certain Boiler Explosions." He said :—On one occasion, some six years ago, I wanted to cool a red-hot copper ball. For this purpose I plunged it into some water in which I had just washed my hands. The hot ball went in without any hissing or visible evolution of steam, and on removing it from the water it appeared as hot as before ; in fact, it remained brightly incandescent somewhat below the surface of the water. I was astonished to see this, as I did not know that the spheroidal state of water could be so readily produced and maintained by a body at this temperature. So I tried other red-hot bodies in the same water, and with the same result. I then threw away the soapy water and used plain water ; the result was now quite different, the hissing was loud, and the evolution of steam copious. Hence the soapiness of the water was concerned in the phenomenon. Adding a little soap to the water immediately reproduced the result first noticed. Other bodies that dissolve in water were also tried, and the results are briefly these :—Albumen, glycerine and organic liquids generally facilitate the acquisition of the spheroidal state, probably by increasing the cohesion of the water, whilst, of course, bodies such as ammonia, which readily yield vapor, have the same effect but not so marked. Oil shaken up or even placed on the surface of the water, has the same effect as the soap. The best method of exhibiting the experiment is to pour a little of Plateau's soap solution into a large beaker of water, and then, by means of a hooked wire, lower into the liquid a white hot metal ball, some 2 lbs. weight, copper being the best. The ball smoothly enters the water, and glows white hot at a depth of a foot or more below the surface. Notwithstanding the considerable hydrostatic pressure, it is seen to be surrounded by a shell of vapor, perhaps half an inch thick. This vapor shell is bounded by an envelope that resembles burnished silver, and has a most striking appearance. In fact, the hot ball blows a soap bubble of steam, from the limiting surface of which the light is totally reflected. As the ball cools (mainly by radiation) the shell of vapor is seen to grow thinner, and finally collapse altogether, when immediately there follows a loud report, volumes of steam are produced, and often the glass is broken. I have heard that traces of oil often get into the boilers of steam engines, and there can be no doubt that dissolved organic matter often finds its way in. If in any way we increase the intensity of the water we render it possible for a corroded boiler to give way under the pressure of the steam suddenly generated in the way I have indicated.

Mirage.

PROFESSOR EVERETT read a paper on "Mirage," in the course of which he described an interesting experiment devised by Professor CLERK MAXWELL. In this experiment, the beautiful effects of mirage were obtained by means of three liquids in a cubical vessel with plate glass sides six inches square, the lowest liquid being a saturated solution of alum, the highest pure water, and between them a thickness of about a quarter of an inch of Scotch whiskey, containing enough sugar to make its specific gravity intermediate between those of the other two liquids. It is much more refractive than either of them. Triple images were obtained, with great distinctness, of all the objects in an extensive landscape, the middle image being inverted, and either elevated or depressed according to the position of the eye. The range of triple vision extended to objects as far as 10 degs. from the horizontal direction, either above or below, and all three images were sufficiently distinct to show whether white blinds were up, down, or half-way down in a row of houses at the distance of 700 yards.

Boring for Science.

It seems that the bore hole which is to be put down in England, is not so much for the sake of discovering coal as to ascertain what the lower formations really are. The project is due to Mr. WILLETT, and he was incited to the proposal by thinking of some fitting method of greeting the British Association on its visit to Brighton. The happy thought struck him that scientific men could not be better met than by a scientific work. Upon inquiry he found that not one single experiment for purely scientific purposes in the Southeast of England had ever been made. He therefore considered himself fortunate in having hit upon a problem yet unsolved. He pronounced the purpose of the work to be "To ascertain (by actual experiment of a boring) the nature and thickness of the geological strata lying immediately beneath the lowest series of the Wealden formation in Kent and Sussex (known as the Ashburnham beds). Thereby to put an end to the difference of opinion among scientific men on the subject, who may otherwise continue to form adverse speculations for another century. Subordinately, to ascertain whether carboniferous strata (as in Belgium and the Boulonnais district in France) extend across the channel in this direction. To endeavor to reach Palæozoic rocks, if such exist within 2,000 feet of the surface, and to ascertain the temperatures of the rocks (successively reached), by the methods and instruments recommended by the British Association Committee on Subterranean Temperatures." The bore hole will be 9 inches in diameter, and the estimates of the depth to be sunk are *max.* 1500 feet ; *min.* 730 feet. The site is at Councellors Wood, in the County of Sussex.

The American Institute.

THE Fair is at length well under way, if not in full swing. There always will be exhibitors whose opening day comes long after the right time, and this year is not free from them. So far as we have observed, the Fair suffers in the morning hours from the still half-deserted state of the city, but that is quite incidental to the season, and is the usual experience. The attendance is better in the evening. We will give our attention first to the machinery section, which occupies its old position at the east end of the building. There many of our old friends are gathered, with a sprinkling of novelties.

The Baxter portable engine is represented in four sizes—all, we believe, that are made. They rate 2, 3, 5, and 8 horse-power, and in seeing them at work, their peculiar compactness and evident firmness is quickly noticed. Their base is greater in proportion to their height than that of most upright boilers, and there is none of that appearance of top-heaviness which the upright machine so often has. Their peculiarities are known to our readers from former descriptions in this journal. Machinery placed square on the top of the boiler, and a steam cylinder wholly immersed in the steam dome, are the main points in their design. The valves, cut-off, and pump are worked from eccentrics on the main crank shaft, which also carries a pulley and driving-wheel. In workmanship they equal any machine work produced in America, as, indeed, is to be expected from their makers, the Colt Arms Company. All the parts are shaped true, so that expansion produces no avoidable strains, and the principle of interchangeability must tell considerably upon the cost of setting up. Experience proves that this engine makes steam rapidly and economically, and the care taken to prevent danger from explosion has relieved it from the usual pariah condition of boilers, so that by insurance men it is ranked, in point of danger, with an ordinary stove. Undoubtedly, the small size of the machine adds greatly to the attainable strength of its parts ; but none of the known methods of increasing this freedom from danger have been omitted. We have been informed that these engines are meeting with rapid sale, and find great favor wherever used. The field for small originators of power is immense, as any one will believe who goes about a great city and sees the odd corners into which they are tucked. For these city uses, we had almost said for office use, the Baxter is exhibiting marked adaptability.

Messrs. W. D. ANDREWS & BROTHER show their carefully-made and beautifully-acting pumps. All their work is moved by oscillating cylinders and pistons, the speed and neatness of which attract the crowd of observers which we have noticed for years about their stand. They have several sizes, from a half-horse power up to a large rotary pump throwing a stream of water through a nine-inch tube. They also exhibit an excellent hoisting engine of the friction order. Transmission of power by friction instead of cog-wheels has advantages that must strike any one who witnesses the quiet and steady action of these machines, operating without shock. Friction surfaces, too—like belting, which is but another form of transmission by friction—afford a simple means of neutralizing the effects of any accident which can put sudden and overpowering strains upon the machine. They allow "slip," which acts like the weakest part in a coupling, and converts the dangerous force into harmless motion.

Opposite to these is a collection of Niagara pumps of which we illustrate one kind on another page.

Further on in this room are a number of furnace appliances. TUPPER'S compound Grate Bar, with which most of our readers are acquainted, is not an article which makes the "show" of some other exhibitors, but it has real merit, and has proved its usefulness under many boilers. The Keystone Forge is a portable blacksmith's forge, fitted with a small fan to be turned by hand. This gives a steadiness as well as a volume of blast that can hardly be attained by the bellows. The BAYLISS Tuyere, also a forge tuyere, is near by. This is cast hollow so as to permit the circulation of water. Both bottom and side tuyeres are made.

The EDSON Recording Steam Gauge, officially adopted last year by Congress, is exhibited in a number of patterns. Congress which makes its use obligatory on steamboats, ought to add to the law a provision that whenever a steamer meets with a boiler accident and sinks, the recording gauge should be brought up by divers. At present we do not know that these gauges have offered their silent testimony in any of the disasters which have been so numerous in the last two years.

WEST'S Improved Hand Pump is a very simple machine, having but two necessary valves and no stuffing box. It is substantially made and works with ease, throwing a steady stream. It is having increased use in mines where its ability to raise water to a height makes it often a desirable machine. It is double-acting and "anti-freezing." The exhibitors, J. D. WEST & Co., 40 Cortlandt street, have had this pump for many years in the market, and, we believe, it has met with unvarying favor at the hands of the public.

THE ENGINEERING AND MINING JOURNAL.

ROSSITER W. RAYMOND, Ph. D.,
JOHN A. CHURCH, E. M.
Editors.

PUBLISHERS' ANNOUNCEMENT.

THE ENGINEERING AND MINING JOURNAL *is projected in the intent of furthering the best interests of the Engineering and Mining public, by giving wide circulation to original special contributions from the pens of the ablest men in the professions. The careful illustration of new machinery and engineering structures, together with a summary of mining news and market reports, will form a prominent feature of the publication.* It is the Organ of the American Institute of Mining Engineers, and is regularly received and read *by all the members and associates* of that large and powerful society, *the only one of the kind in this country.* It is therefore the best medium for advertising all kinds of machinery, tools and materials used by engineers or their employees.

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Did not some of the "rough" customers who bought uncut diamonds of the leading London merchants hail from other than American diggings? A correspondent of the "Melbourne Leader," (Australia) says: "It is rumored that a well-known prospector brought into Armidale, a few days ago, a veritable diamond. The locality will, before long, be very carefully examined, with a view to ascertain whether it may not contain similar gems."

We are promised visits this Fall from two European men of science, Professor TYNDALL and Dr. BÜCHNER. The first is too well known to need any introduction from us. His originality in investigation, combined with his powerful way of telling what his results are, have made him the representative of that class of men, happily well filled now, who unite profundity of thought with a deep sympathy for less learned men. He is a Teacher, and one of the best in the world. Dr. BÜCHNER is a man of a different stamp. Not an original investigator, at least to a notable extent, his work has been to think over the labors of others and give the world his conclusions. He is not exactly a critic, but rather a teacher. He has done good work in popularizing science without demeaning it. His first work was "Force and Matter" which earned him a dismissal from a professorship in the University at Tübingen. That drove him to medical practice in Darmstadt, but, uniting scientific study to the regular work of his profession, he has published "Nature and Spirit," "Nature and Science" and "Man in the past, present and future." This last work has been translated by Dr. DALLAS, of England, and the English version appears in this country only a few weeks in advance of the German author. We can best characterise these works in this short paragraph by saying that their author belongs decidedly to the school of "new science," is a follower of DARWIN, and in his last work, as the tittle shows, treats of a Darwinian subject. In this book nothing is original but the treatment. The discoveries of others are his theme, but they are discussed by one who is a born teacher.

Institute of Mining Engineers.

We desire our readers to take particular notice that the next meeting of the Institute will take place in Pittsburgh *one day later* than the regular time. Instead of Tuesday, October 15th, it will be held on Wednesday, October 16th. The reason for this change is that two other societies meet in that city in advance of our Institute, and it is desired that our meeting should not clash with theirs', but be a continuation of them. As the gentlemen composing those societies are interested in the iron business, it is hoped that those members of the Institute who are similarly employed, will endeavor to be on hand, and not only that, but will come with papers that will show these fellow-workers the quality and importance of our society. Pittsburgh is such a center for the iron trade that a visit to that city is compatible with the interests of almost every iron maker, and the circumstances in the present case are such as to add unusual inducements for the journey. We trust they will be well heeded.

The Secretary of the Institute has issued the following announcement.

The next meeting of the Institute will be held at Pittsburgh, Pa., Wednesday, October 16th, at 8 o'clock, P. M.

The Monongahela House is designated for members to assemble at, and the place of meeting to be hereafter announced.

The objects of interest in and about the City of Pittsburgh are so many and so diversified, that they cannot all be visited, and the selection will be mostly left to the members.

A meeting of the Council will be held at 11 o'clock A. M., Wednesday, October 16th, at the Monongahela House, and promptness is urged for the disposal of important business.

By order of the Council.
MARTIN CORVELL, Sec.

Machine Puddling.

Puddling devices are all the rage if we may judge by the number of new machines brought out. The Danks furnace is meeting with steady and rapid acceptance in England in spite of the legal difficulties, with which he was threatened. It is expected that in some places the metal will be run direct from the blast furnaces into the puddling furnace. It is thought that there is no reason why this plan should not be adopted in all cases where the furnace of Mr. DANKS is erected. Other inventors are also coming rapidly forward. A Lake Superior man is building a rotary furnace to use powdered fuel. But English genius is this time to eclipse everything American. The great secret of uninterrupted puddling has been found there. A furnace is building which consists of a long cylinder, somewhat inclined and revolving. In one end runs a continual stream of melted iron while perfect blooms roll out at the other extremity. We think we see our way clear to saying that, when this is in successful operation, it will be decidedly *the* thing and as it is not finished yet, we recommend our readers—to wait and see. Mr. DEPTY, of Middlesbrough, England, is the inventor, and he proposes to gain practical experience of his ideas this month.

The International Bridge Across the Niagara River at Buffalo.

THE project of bridging the Niagara River near Buffalo has been for years past a matter of interest to both American and Canadian engineers. Forming a part of the charter of the Buffalo and Lake Huron Railway (now incorporated with the Grand Trunk Railway of Canada), since the year 1858, successive parties of engineers, under different auspices, and at several points, have sounded the river with a view to the construction of a bridge. Failures of these various enterprises have prevented the accomplishment of the object, until it was taken in hand by the Grand Trunk Railway, some four years ago. Recognizing the immense advantage to the communications between East and West that such a bridge would afford, and that the growing traffic had rendered it a necessity, a company was formed of English and American capitalists, styled the International Bridge Company, with C. J. BRYDGES, Esq., of Montreal, as President. Active steps towards securing the necessary charters from the United States and Canadian Governments were at once taken, the location of the bridge fixed, and right of way secured, and in May 1870 the works were commenced under C. S. GZOWSKI & Co., the contractors. The gentlemen composing this firm having had large experience in public works both in Canada and the United States, and being men of large capital, were peculiarly suited for the work which they undertook, especially as the head of the firm, Mr. GZOWSKI, is a practical engineer of extended experience.

It was decided that the bridge should be an iron superstructure on stone piers, and after much deliberation, the Pratt truss, as manufactured at the Phœnixville Iron Works, Phœnixville, Pa., was adopted. This truss has been used in many bridges over the Ohio and Missouri rivers, and notably at the Quincy Bridge, over the Mississippi, where it has served most successfully. This was taken as the model upon which the International Bridge was to be constructed. The location having been fixed between Black Rock and Buffalo, the width of the river being broken at that point by Squaw Island, it was found that the main river measured 1,894 feet, and Black Rock Harbor 445 feet, or a total of 2,339 feet to be bridged; while Squaw Island was to be crossed by an embankment 22 feet in height and 1,328 feet in length. The depth of water varied from 13 to 47 feet. at the points for the piers, and the normal current at low water from 2.58 to 5.12 miles per hour.

The first intention to place the swing in the center of the river having been luckily avoided, at the suggestion of the Board of Engineer officers appointed to examine the plans by the United States Government, and consisting of General WARREN and Colonels MERRILL and HARWOOD, U. S. A., it was finally determined that the spans should be as follows, viz.:

In Main River,	4 spans	197 feet	=	788 feet.
"	"	3 "	248 "	=	744 "
"	"	1 draw	362 "	=	362 "
In Black Rock Harbor.....	1 span	223 "	=	223 "
"	"	1 draw	222 "	=	222 "
				2,339 feet.

These spans rest on piers in the following depths of water, viz.: No. 1, 12 ft. 3 in.; No. 2, 18 ft.; No. 3, 29 ft. 3 in.; No. 4, 36 ft. 6 in.; No. 5, 42 ft. 6 in.; No. 6, 32 ft. 6 in.; No. 7 (Main Draw Swing Pier), 14 ft.; No. 8, 9 ft.; No 9 (Canal Draw Swing Pier), 13 ft.; No. 10, 9 ft. These piers number from the Canada shore.

The piers are built in 12×12 inch timber caissons, made water-tight, and strongly braced. The bottom, to a certain level, is filled with concrete, made of broken stone, fine gravel, or sand, and Akron hydraulic cement. On this the footing course of heavy blocks of limestone is placed, and the pier built. The dimensions of the first three piers is as follows: Length of coping, 29 ft.; width, 7 ft. 6 in.; batter of back, 1 in 24; batter of front above cap of ice-

breaker, 1 in 24; batter of icebreaker, ½ to 1; angle of icebreaker, 45 degs.; batter of sides, 1 in 24. The height of course varies with the depth of water.

The shape of the pier is an oblong, with a rectangular nose-piece, or cutwater. As an example of the work, the following details may not be uninteresting:

No. 2 Pier is built in 18 feet of water. The size of the timber caisson in which it is built is 55 feet in length by 19 feet in width, containing 4,470 cubic feet timber and 3,309 lbs. iron. When the pier was finished, the top courses of this caisson were removed to the depth of 5 feet below the water line. There is an average depth of 10 feet of concrete in the bottom. On this the footing course of 2 feet thickness rests, the height of the pier above the footing course being 25.28 feet. The normal velocity of the current is 2.77 miles per hour. The weight of materials placed is as follows:

Timber	148,764	pounds.
Iron	3,000	"
Concrete	877,500	"
Masonry	1,112,300	"
Superstructure	258,562	"
	2,400,126	
Weight of water displaced	932,014	"
In favor of stability	1,468,112	"

The construction of piers Nos. 4, 5 and 6 presented difficulties that forced the adoption of other means for securing a foundation. The engineer who located the bridge supposed that the tremendous current of Niagara river would scour the bottom free of gravel, and this assumption proved to be the case near the shore. But in deep water, that is to say, over the surface on which piers 4, 5 and 6 rest, there is a layer of gravel from 3 to 7 feet thick. This fact was ascertained so late that the contractors lost one caisson in consequence of not being prepared to meet this emergency; and they also sustained partial loss on two others. Through this unfortunate error the summer of 1871 was lost in vain endeavoring to obtain a proper foundation, and at a great expense to the contractors.

Under these circumstances the following mode of operations was decided upon: A coffer dam 120 feet in length, made of 12 in. × 12 in. timbers, with a 30 inch space between, is floated down to position and sunk; after which the caisson is placed within the dam and sunk in quiet water. But the placing of these coffer dams is the most delicate part of the whole work and deserves more careful consideration. The body of the coffer dam is but 100 feet long, but it has a "fin," or solid tail of timber 20 feet long. This fin acts like a rudder in the swift current and keeps the dam in line. The foot of the dam is formed of a sharp-edged iron shoe, above which the timber is filled in solid for several feet.

The ground is first levelled off sufficiently to secure perpendicularity to the coffer dam, but the perfect accuracy of the caisson is further ensured by the size of the dam, which leaves two feet of clear water between the dam and caisson at the sides, and 12 feet at the ends. If the dam, the sinking of which is the critical work, is not quite in place, the caisson can still be properly positioned.

When this is finished the coffer dam is floated down stream and fastened by the prow to scows which are heavily anchored. Its position is a few inches up stream from its resting place, and some fifty air-tight barrels are floated within it in such a way as to be released by the cutting of one line. The space between the skins is then filled up with large rubble stone until the dam has sunk to within one foot of the river bed. The removal of the artificial buoyancy imparted by the oil barrels permits the dam to drop instantly to its true position. At the same moment, and indeed by the cutting of one rope the barrels are released, the scow fastenings slipped, and heavy iron spuds which run in well holes, cut through the dam, are dropped. All act at once and so quickly that bottom is touched before the dam has moved down stream. The over weight of the dam forcing the iron shoe in the gravel, together with the bite of the spuds on the bottom, is now sufficient to keep it in place, and the filling in goes on until its stability is ensured.

Preparation for the introduction of the caisson now commences. The gravel is dredged out and the dam sinks down to the clay, a very hard layer of which is found in immediate contact with the rocky river bed. Two top courses of timber are then removed, and the caisson which, at this stage of the proceedings, is only seven feet high, is floated into the dam. The work of building up and filling in the caisson with concrete and stone now goes on simultaneously, until the perfectly level bottom is reached and the foundation of the pier is completed.

From this short account of the engineering in the Niagara river it will be seen that Mr. HANNAFORD, the Engineer for the Bridge Company, has most ingeniously solved a difficult problem; the accurate placing of piers in a swift and changing current of water. He trusts to floating stability up to the moment when the dam is able to take care of itself, when, at one stroke, it is thrown upon its own resources.

Piers 7, 8, 9 and 10 are built on pile foundations, though the system explained here is otherwise carried out. The piles are cut off by a circular saw, the frame-work of which runs on the top course of the dam, so that the surface of the piles is exactly parallel to the top course of the dam. The front of these piers is secured by rip-rap stone work. Piers 7 and 9 are the swing piers, and are octagonal, containing about 350 yards of masonry each, and measuring 40 feet across. The bridge swings on to rests, up stream, which are furnished with cutwaters like the other piers, and act as ice-breakers to the swing piers. The machinery of the swing consists of two 40-horse power steam engines, and hand powers are also attached. The swing can be opened inside of two minutes. The superstructure, consisting of a bottom chord of open links, with pin connections, rolled top chord and posts, diagonal braces and tension rods, is entirely of wrought iron. The bed plates and caps alone being of cast iron. The work is of the neatest description, all joints being planed or turned, all screws upset, and all pin-holes cut out of the solid plate. Every portion has been subjected to a tensile strain of 10,000 lbs. to the square inch. The first span of 179 feet was tested by 217 tons of iron rail, loaded in the center, causing a deflection of 1¾ inches; on the iron being removed, it returned to its original camber. The execution of the iron work is in every respect first-class, and reflects the greatest credit upon the Phœnix Iron Company.

Although delayed by a series of averse circumstances, and the fact that no previous work of the kind afforded a precedent for dealing with so rapid a current as that of Niagara, the contractors are pushing the work with the greatest energy, and hope to finish it early next year. Considering the difficulties they have had to contend with, and the fact that the speed of the current has been known to double inside of eight hours, the work presents difficulties such as the engineer seldom has to face, and much credit is due to Messrs. GZOWSKI & Co. for having carried it so far successfully. Much has been done, but much still remains to be done before the iron horse can complete the international link between the two countries, and we trust that continued success may attend their efforts.

The design of this work is due to Mr. E. P. HANNAFORD, Chief Engineer to the Bridge Company. Mr. JOS. HOBSON is resident Engineer for the Company, and Mr. T. C. SCOBLE is Engineer for the Contractors. The stone work has been supplied by MORRISON MCRAE, and the timber by H. MACFARLANE. As before said, all the iron work is from the Phœnixville Company. Mr. OTTO MEYER, lately, we believe, employed on the East River Bridge, is in charge of the arrangements for sinking the coffer dams.

EDITORIAL CORRESPONDENCE.

Affairs at White Pine.

HAMILTON, Aug. 29, 1872.

The unmistakable signs of dull times are upon White Pine. Hamilton, the chief city of the district, is funereally solemn. No crowds congregate in its quiet streets; the merchants are selling out at great sacrifice, preparatory to removal to Pioche or Robinson or Schell Creek, whither all the "roughs" have gone already. The houses, even, are disappearing; for in this region of scarce building materials, a house is frequently the companion of its occupant in his pilgrimages. It is said that 75 edifices, at least, have started on their travels from Hamilton this year; and many of those that are left stand empty, sighing to be gone, with placards vainly calling for tenants, upon their locked doors.

Yet White Pine is not utterly played out, though the reaction from the sanguine hopes and reckless swindles of an earlier time is a staggering blow, and the fresh excitements of the year have drawn off the surplus population. Between four and five hundred men are still actively employed in the mines, and three large mills, the International, of the Eberhardt Company, the Manhattan, of the Ward Beecher Company, and the Big Smoky, of the Hidden Treasure Company, are constantly running.

The developments of the past year have tended to demonstrate that the principal mines on Treasure Hill—both Auroras, the Ward Beecher, the Silver Wave, the Hidden Treasure, the Sheboygan and the Mammoth, are situated upon a continuous belt or channel of ore, bounded on the west by a vein or dyke of calcite, and extending in depth—would that we knew how far! This question of depth is the vital one at present. Explorations with the diamond drill have not yet resulted in anything favorable; but they have not been sufficiently thorough to decide the question. The Wheeler tunnel of the Hidden Treasure Company is advancing towards the point where the downward continuation of the ore may be found, 500 feet below the surface. Indications are said to be encouraging. So far as I can learn, they consist in the cutting of a spar vein supposed to be the *eastern* boundary of the ore-belt, and the finding of rock beyond it similar in appearance to that in which the ore occurs.

Meanwhile, the Eberhardt Company is doing much better than heretofore. The old Eberhardt mine is not worked productively; but the Ward Beecher ground, subsequently acquired by the Company, contains a large body of high grade ore (reported at $100) and keeps the large International mill running. The wire tramway, which has cost so much, is working satisfactorily, except in the matter of wire rope, which it uses up at a frightful rate. The shipments of the company are now at the rate of $90,000 per month.

Other mines on the hill have a good deal of low-grade ore. The South Aurora is idle, and a director of the company is here, to decide whether work shall be continued, in the way of exploration, or stopped altogether. The splendid Stanford mill of the company is likewise idle.

In the absence of new discoveries of milling ore in depth, another year would probably put an end to active production in White Pine, unless the "base metal" mines, some of which possess undoubted value, should be again revived. The attempt to smelt in this district has everywhere failed; but the causes of the failure are not irreparable. The metallurgical difficulties, which arise from the abundance of lime and lack of silica, may be overcome by the use of ores from some of the new districts—or the cheapening of transportation may permit the sale of ores direct to buyers, in the present favorable state of the market. The failure of GEO. MATTISON'S ambitious and extravagant enterprise was a great injury to the district, in discouraging all attempts to handle the base ores. His works, foolishly located high above the town, now stand in the desolate glory of

whitewash and gold-knobbed flagstaff, as solemnly silent as the old cemetery which adjoins them.

—— Aug. 30. This morning comes the news that the International mill of the Eberhardt company was destroyed during the night by fire. Every man in town feels it as a personal loss ; for all realize that this plucky English company was the mainstay of White Pine. It is fortunate that the disaster has occurred at a time when the mines of the Company are looking better than at any time since their purchase, as there is now no reason to anticipate that they will be tempted to suspend operations, even under this sudden calamity. It is known that some time ago the mill was insured for $250,000. If this insurance has been maintained—as I trust—the loss will not be serious, as the Stanford mill, (30 stamps only, but with much more than half the capacity of the 60 stamps of the International) can undoubtedly be leased or bought, and the Company's production in great part maintained.

Being on the point of leaving for Eureka, I must forbear to discuss affairs in this district in further detail. It is one of the inconveniences of rapid tours like this, that one sees more in a day than one can reduce to writing in another day ; and moreover, the time employed in recording observations is so much taken from the precious time allowed for the more attractive work of making them. R. W. R.

Block Coal.

TO THE EDITOR, SIR :—

Anyone who remembers the old-fashioned "Russ Pavement"—rough paralellograms of granite, crossing the street in rows at nearly right angles with its course—can easily picture to himself the structure of a block coal field. He need only magnify the thickness of the blocks from six inches up to three feet or so and their length and breadth in about the same proportion or rather less, and fancy the pavement spread out in basins, acres or miles in extent, varying considerably in level, slope, thickness and quality—generally thickest toward their centres and thinning out toward their edges—often streaked with gutters, breaks, interruptions,—and the whole overlain by strata of slate, shale, rock, clay etc., and finally by the hills and valleys of the surface ; and he has a fair suggestion of the physical features of a "block coal field."

The blocks of coal, with their slightly irregular edges, sides and shapes, laid side by side, sometimes in contact and sometimes with an interstice of half an inch or more, are usually again separated by horizontal sutures, not absolutely fracturing them, but making them liable, on exposure to sun and air, to fracture in horizontal strata of a quarter of an inch in thickness or so. These sutures are filled with a very thin layer of mineral charcoal, which comes off and crocks the hands when the laminæ are divided, although the block before splitting is perfectly clean, there being none of the mineral charcoal in the vertical sutures.

The vertical sutures are filled by clayey washings from the superjacent strata. These washings give the coal a bluish, dirty look, but do not interfere with its burning qualities at all. Even for iron, making the "clay-marked" coal is often preferred, from having less sulphur than the darker, harder and handsomer coal that sells better for domestic use.

For making iron without going through the previous process of coking, coal needs first, freedom from sulphur and phosphorus ; second, strength of structure, so that it shall not be crushed down into powder by the vast weight of the charge of a blast furnace ; third, the quality of "dryness"—absence of a tendency to melt and agglomerate under great heat. Many coals have the first, and many have even the first and second qualities ; but they are quite useless without the third, which is peculiar (among bituminous coals) to the "block coal." The scaffolds formed when "melting" or "caking" coal is thrown into a blast furnace, sometimes causes dreadful accidents ; the lodged mass of coal, ore and lime, falling with a terrible splash into the melted metal in the hearth, sometimes rupturing the very walls of the furnace and at others bursting out at every aperture in a fiery shower enveloping the workmen and causing sad loss of life. At one of the Indiana furnaces there is now a man frightfully scarred with burns, who was one of three men enveloped by the fall of a "scaffold." He rushed into a neighboring stream and so saved his life ; the others were killed.

The best block coal was originally found in the Mahoning Valley, Ohio, where the old "Brier Hill" mine of Governor TODD made a fortune for its owner and gave its name "Brier Hill" to all the coal of that locality. About eight or ten years ago some residents of the Mahoning Valley, on their return from an unsuccessful search in Kentucky for a good coal speculation, stopped at Terre Haute, Indiana, and there saw some coal which had been mined in the small surface diggings at Brazil, near by. They noticed the similarity between that and the Mahoning Valley coal they had been accustomed to. By their representations some Ohio men entered on the exploration of the Indiana coal—first sending a few car loads all the way to the Mahoning Valley Iron Works to be tested. A blast furnace was soon under way which succeeded, and a second was started, the cost of which as it was erected, is said to have been met by the profit on the operation of the first. Others followed, but even now there are but eight blast furnaces in the region. The business is in its infancy, although it is a wonderful growth to have occurred, as it has, in eight years.

It is not to be supposed that all the enterprises are equally successful. Mines have been opened and abandoned ; furnaces have been put up and have failed in the very heart of the region. Of two mines, within half a mile of each other, one may produce a good iron-making coal, while the other does not. A furnace erected at the latter makes 18 tons a day of No. 4 iron while that at the former, with the same expense, makes 28 tons of No. 1. The former fails, its failure being variously attributed to bad coal, bad ores, bad flux, bad blast, bad mixture and proportions of coal, ores, flux, and blast. Anything and everything is alleged as the true and only reason of its failure. It becomes bankrupt, passes into new hands, uses new coal, new ores, new flux and all under new management, and behold, a success as great as was its previous failure. If the new experiment coincides in time with a great rise in pig iron, such as has taken place within the last year, then a fortune in a year is hardly an exaggerated estimate of the result.

The coal mining is not quite so risky a business as the iron making. Coal which will not do for the blast furnace will often bring in general market as good a price as the iron works can pay, or better. Much iron-making coal is too friable for long transportation, storage and frequent handling, while much admirable market coal, hard, bright and strong, is too impure for the furnace. Any miner who has coal good for both uses, has two strings to his bow. But one string is often as good as a dozen. If the miner has a good demand for his product, all he need then strive for is to keep the margin good between the operators who work for him and the customers who buy from him, and obtain by hook or by crook a steady supply of cars to load his coal in as he mines it ; then his gains are sure, beyond reasonable peradventure. Even then there are contingencies, as miners have most of them found to their cost, the block coal stratum being more unstable in its characteristics than other coals. There are more faults, horsebacks, rolls and troubles of all sorts than are ever found elsewhere. An entry which you are driving forward in a workable thickness of coal may suddenly "peter out" to an unworkable thinness. You can only guess whether the difficulty is temporary or permanent. You may drive ahead, at great expense, for hundreds of yards without refinding the lost treasure, and finally you may fail or give out discouraged when within a few yards of a new development of profitable coal. Only one thing is certain, viz : that if you do stop, you will always fancy that it was within a short distance of all you had been so long seeking. When the nature of the ground will allow of boring, a great deal of this uncertainty can of course be forestalled by drill-holes. These however are tedious, expensive and uncertain, as far as accuracy goes, unless carried on with extraordinary care and ability. Holes are spoiled by tools getting lost or wedged in them. Careless operators drill a foot or more into a stratum before they recognize the fact of having struck it. Or at any rate, you are always suspicious that they have done so, especially when a coal seam which you wish to believe is three feet thick, is reported to be only two, and after a drill has once passed a certain point, there is no possible way of returning to that point and locating it.

These are some of the disadvantages of working in the block coal. Another is the general thinness of the stratum. Three feet and a half is above the average thickness of the Indiana block coal seam. Of common bituminous coal Illinois and Indiana have hundreds of square miles, more than six feet thick. In coal of identical character this difference in thickness would almost double the cost of the coal from the thin seam over that from the thick.

On the other hand, the block coal has certain advantages in handling that make it a favorite coal among diggers. They bear in at the bottom, in the face, across the whole room, to a depth of say eighteen inches, or whatever distance is necessary to reach the next perpendicular cross seam. Then the whole series of blocks is often ready to fall by its own weight as soon as one block is wedged out to give play to the angles of the solid cubes. Or if they stick a little at the top and sides, a comparatively slight amount of work with wedge and sledge brings them rolling out, all ready to break up into convenient sizes for handling. No blasting is required in the block coal, which is a saving in powder, in destruction of coal and in ventilation of mines, as well as in labor and in time of blasting and waiting for the clearance of powder smoke.

The value of block coal may be fairly taken as about fifty per cent above that of other bituminous coals. Taken at the mine mouth, this would not really pay for the extra cost of extraction. But as the main item in the price a consumer pays for coal is the cost of transporting it, and as the block coal costs no more freight per mile than the other, the value at the mine mouth is more nearly double that of the other. Ordinary Illinois bituminous coal may be quoted at wholesale in Chicago at $4 per ton ; the block coal at $6. This would make the latter worth $3 50 to the $1 50 which is about the price of the cheapest coal at the mine. But in fact the transportation is longer on the block coal by a distance costing about $1 per ton, so that the prices of the two styles of coal (six feet seam vs. three feet seam) may be set down at $1 50 and $2 50 at the mine mouth. J. KIRKLAND.

VEEDERS, FOUNTAIN CO., INDIANA.

MINING SUMMARY.

Arizona.

MORE ABOUT THE DIAMOND BUSINESS.

The Prescott *Miner* of August 24 says :

Wealth will have its worshippers. Treasures will not be permitted to lie still in the ground much longer, and Arizona is now the ground from which thousands of fortune seekers propose to gorge themselves with gold, silver and gems "of purest ray serene."

Well, let them come on, this Territory is a very large one ; yes, large enough to hold ship-loads of precious stones. But, we reassert, do not come here at our invitation, to fill your sacks and purses with diamonds and such, for we are not prepared to say, positively, that such *gems* do exist here, although we rather think they do.

The foregoing remarks are, of course, drawn out in consequence of the terrible excitement in San Francisco

about an immense diamond field in this Territory, which excitement was, at latest dates, feeding upon the report of Mr. Janin, which appears on the first page of this paper.

TOM MINER,

the "Bilk," as he is known here and elsewhere, was in the city, at the head of a company, preparing to start for his diamond ranche. A woman had applied for admission to strike out with Tom's company.

Force Gregory and one or two other members of last year's Miner party, were in the city. Gregory speaks of a man named McCullum or McCallum, who was a member of the party and who found some precious stones, the value of which he did not make known to Miner. Joe. Voshay and others were in the secret. Miner's field of diamonds is somewhere in the Pinal mountains.

Two rival companies are now organizing their forces for Arizona—Miner's and Harpending's

Another company has been organized at Virginia City, Nevada, and its stock was being disposed of. It appears to rest upon the assertions of a Mr. Fox, who says he came to this Territory over a year ago, prospected a portion of it and found stones which have been proved to be precious.

His narrative leads us to infer that he alight d somewhere near Camp Apache; prospected to the northward and found the stones near the line of the 35th parallel, in sandstone formation. His story is corroborated by the following blast from other bugle-horns, which we copy from a late number of the San Francisco *Call*:

LOS ANGELOS, August 9.—Prof. Glass, of Colorado, and the Todd party arrived this evening from an extended geological tour in Arizona and New Mexico, and are direct from the diamond fields. They have with them 1,000 pounds of specimens of gold, silver and other ores, and several pints of precious and doubtful stones, which will be exhibited in San Francisco. On the route from Fort Wingate to Albuquerque, New Mexico, and on the borders of Arizona, in what is called the Ant Hill Regions, their gems were discovered, all at the surface. There are specimens of genuine rubies, from the size of a large pea, downward. The diamonds, if there are any, are small, and at best of little value. They found rich gold and silver bearing quartz near Fort Wingate. The party claim to have discovered and located flowing oil springs that will yield from seventy to one hundred barrels per day. The precise location of these springs they will not divulge. In old mounds and ruins of ancient cities they found relics of tools, pottery and woven cloth. The party are not sanguine as to their diamond discoveries. The ruby specimens will weigh a quarter of a pound.

Throwing the above combustible stuff upon the already brilliant flames that lighted the metropolis of the Pacific will, no doubt, cause a big soul-burning, and hundreds, perhaps thousands, of men will rush to Arizona, immediately, for whom the following information is given gratuitously:

Once upon a time, not many years ago, a certain soldier of Camp McDowell found what he supposed was a big diamond. He took it to San Francisco and disposed of it for a very large sum; busy rumor soon after said that the soldier procured that diamond by "nipping" it from some person who previously possessed it.

Then, Severance & Co., of San Francisco, wrote to us to know if there were diamonds lying around loose here. We objected to giving an emphatic opinion on that point, for the simple reason that we were not qualified to do so.

Old soldiers who took part in driving the Navajo Indians upon a reservation, have told us that the Navajo country—to the north and east of Prescott—contains all manner of beautiful stones, among which, they thought, diamonds manage to fill positions.

Several years ago, Mr. Slack, an old miner of Lynx Creek, in this county, skeddaddled from these diggings, and turned up at the Burro mines, in the interest and employ of Harpending and Roberts, we believe. He remained there some time, when he left for San Francisco and Utah, in the interest of his employers. He is now in the East, "living like a fighting cock," upon cash made while in the employ of Harpending,—some say, the proceeds of the sale of his diamonds, and interest in the claim; others, again, aver that Slack got his cash from the sale of a mine in Utah.

He has old and dear friends here in Prescott, with whom he has corresponded, but to whom he has never once said diamond. It will be seen that Mr. Slack is used pretty freely in Janin's Report.

Van Allen, who came here several months ago, and, with Charles Myers, "silently stole away," towards New Mexico, on a diamond hunt, told persons that Slack took from this Territory a great many diamonds.

We have seen some of the "diamonds" found in the Pinal Mountains, and did not believe they were diamonds.

We have been upon every important river and creek in Arizona; have seen wagon-loads of beautiful stones near the big Colorado, the Little Colorado, the Gila, the branches of Salt River, the Verde and other streams, but cannot say that any of those seen by us were diamonds or other precious stones, but in the light that now shines upon us from San Francisco, we think we show to advantage as a poor, ignorant idiot who has travelled up, down and across Arizona, more than two thousand, miles without procuring so much as a specimen of the numberless precious stones over which we passed. But, they are all around Prescott, and, as soon as their value shall have been established here, we shall endeavor to make up for lost time.

Finally, if people *will* come here in search of precious stones, now is a good time, as the weather is nice; grass and water plenty, and Indians need planting worse than ever before.

From the Prescott *Miner* of August 17th.

PLACER MINING.

The heavy rains of last week have enabled placer miners on Lower Lynx Creek to pursue their calling with pleasure and profit. Sunday last, Mr. SMITH informed us that Mr. LOVEJOY and force were working the rich gravel by the hydraulic process. Mr. SMITH would have had men at work in his claim had not a portion of his ditch been carried away by the flood. He left men repairing it and is, perhaps, now at work taking out plenty of gold.

A. B. SMITH has started sluices further up the creek, and made $20 to the hand the first day. Further up, near the head of the creek, water was scarce, but miners were doing well with rockers. Of course, if more rain does not come soon, LOVEJOY and others will have to suspend washing, but a great deal more rain is due us. Water is scarce on the Hassayampa, and but little placer mining is being carried on.

QUARTZ MINING.

From the Wallapai District the reports are favorable. At Mineral Park, HARDY & Co., were sinking on the Fairfield, which promises to be a mine of great value. HARDY & Co's. mill is constantly running with the usual good results. At Cerbat, Mr. ELDER, with a tenacity worthy of the cause, was experimenting with smelting ores, and, if it is not an absolute impossibility, will overcome the difficulties in smelting, heretofore encountered by him. Several new discoveries of rich mines have been made. Several lots of ore from this portion of the district have been shipped to San Francisco to be worked.

At Empire, E. M. SMITH had commenced on the Empire and Schuylkill, both of which lodes are said to look well. Col. BAKER, a gentlemen of reputed experience and capacity, has commenced building a furnace near the Schuylkill. It is to be hoped that no obstruction will prevent its successful operation. At Chloride the furnace was not working, and but little was being done. A few persons were working their mines in a leisurely way.

The miners of Yuma County are still shipping ore to San Francisco.

Prospecting is going on in Pima and Maricopa Counties.

At home, in Yavapai County, sinking and drifting upon favorable lodes is still going on.

From Bradshaw, the news is very encouraging. E. J. COOK and others have just returned from visiting the Tiger. This is what we have learned from Mr. COOK. After having sunk a new shaft to a depth of 104 feet, Mr. RIGGS started his workmen to cut across the lode, and, when Mr. COOK left the mine, Wednesday last, they had cut into it twelve feet, without developing the least sign of a wall, so that another immense deposit of rich ore is in sight.

Mr. COOK starts this morning for San Francisco, with the view of bringing out a man, means, machinery, etc., to work the Tiger—which, we verily believe, is the richest and largest silver mine on the continent.

WM. A. LINN has also struck another monster deposit in his claim on the Tiger.

Confidence in our quartz mines is so firmly seated that all the sharps and blowhards in San Francisco couldn't "diamondize" a solitary individual here. We have the mines, sure, and mean to stick to them.

JOE VOSHAY and others have recently found some mines near the Colorado. R. W. GROOM and others are prospecting on Williams Fork. Governor Safford is about 280 miles east from Prescott, looking after precious things.

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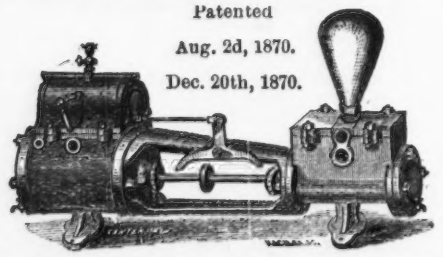

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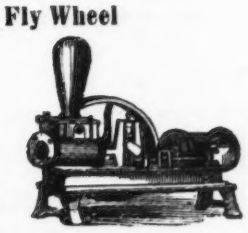

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10	$ 4 60	1-10	$ 1 60	15	$ 1 60	1	$ 1 15
20	16 20	5-10	8 90	20	3 95	5	8 05
30	28 90	1	17 80	25	7 10	10	19 60
40	40 45	1½	27 05	30	11 10	15	31 85
50	52 05	2	36 60	35	14 15	20	45 45
60	63 80	3	55 20	40	17 25	25	58 80
70	76 60	4	73 35	45	20 20	30	72 00
80	87 90	5	92 10	50	23 50	40	96 20
90	100 60	6	111 40	55	26 30	50	127 35
100	111 70	7	129 80	60	29 50	60	155 70
110	124 40	8	148 15	65	32 85	70	185 00
120	137 20	9	168 30	70	36 30	And so on.	
130	148 55	10	186 80	75	39 50		
140	161 10	11	205 30	80	42 85		
150	173 60	12	225 45	85	46 25		
175	205 10	13	244 10	And so on.			
200	234 45	14	263 30				
225	265 85	15	283 85				
250	297 35	20	379 90				
275	329 70	And so on.					
300	361 50						
350	424 20						
400	486 25						
450	549 50						
500	613 75						
And so on.							

NOTE.—In the Original Tariffs the ton of ore is equal to 20 cwt. = 2240 lbs. English, whilst in these tariffs only 2000 lbs. avoirdupois are taken to the ton—thus 291,63 ounces troy of silver or gold in the ton are equal to 1 per cent. For silver contents above 1 per cent. (300 ounces in the ton of 2000 lbs.), generally 2 per cent. are paid in addition to the tariff prices.

The tariffs for Lead and Copper are based upon an average price of 5½ thalers for 100 German pounds (about 3½ cts. gold per lb. English) for Lead, and of 75 thalers for 100 German pounds (about 16¼ cts. gold per lb. English) for Copper; in case the actual prices are higher, the difference is paid extra. At the present time (August), for instance, $71 coin are paid in addition to the tariff prices for 2000 lbs. of Copper; and $13 coin in addition to the tariff prices for 2000 lbs of Lead.

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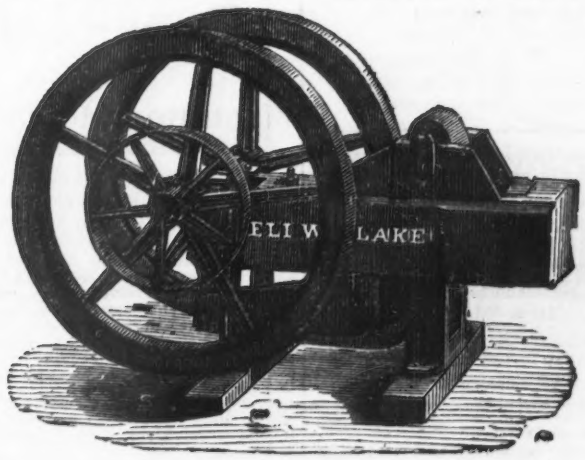

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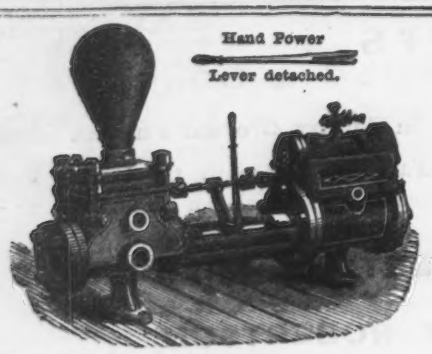

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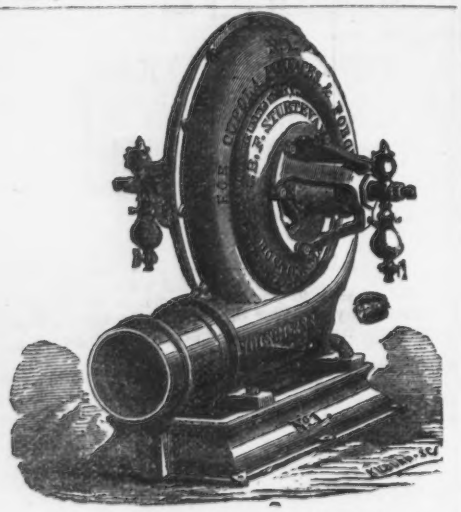

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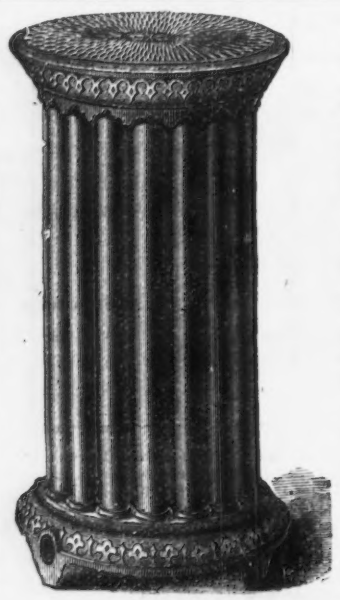

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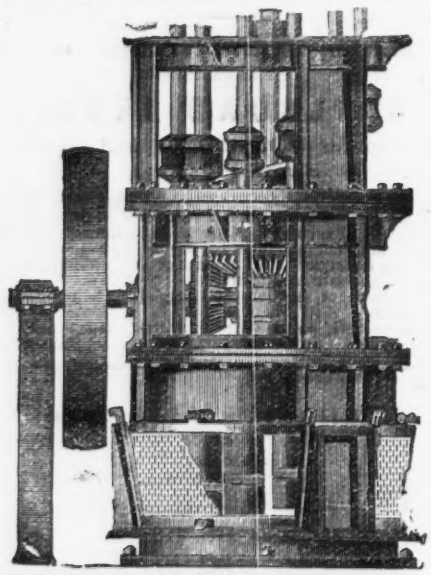

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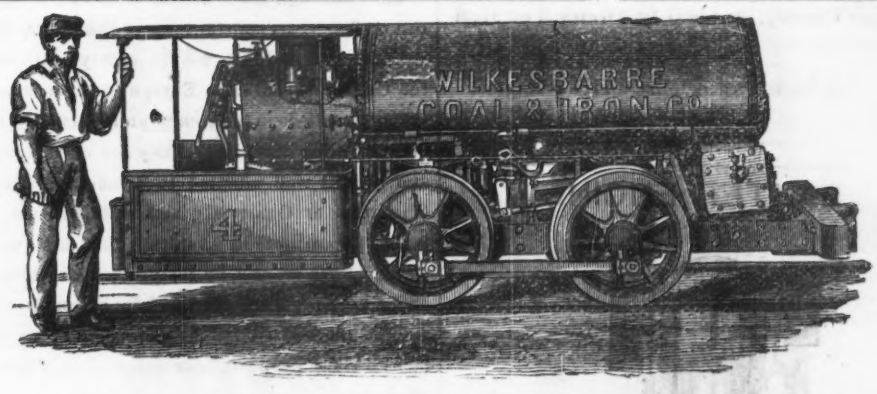

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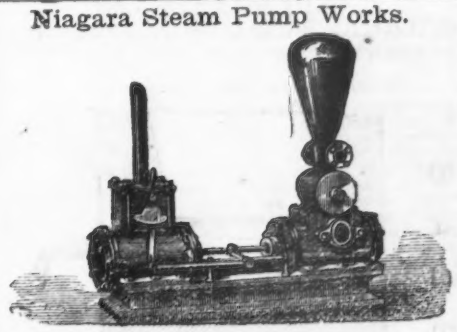

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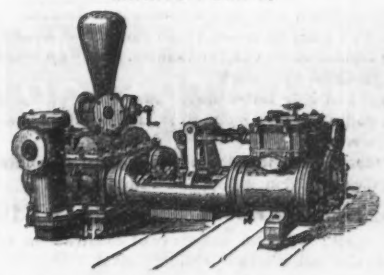

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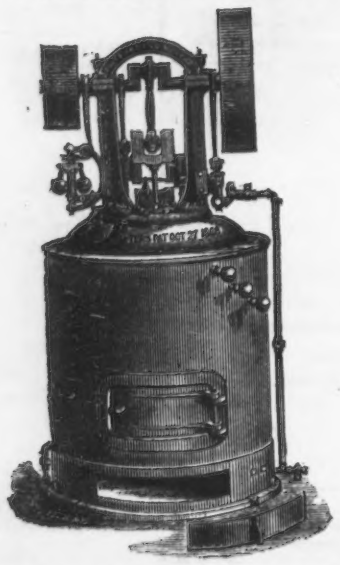

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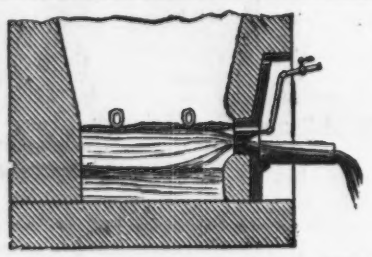

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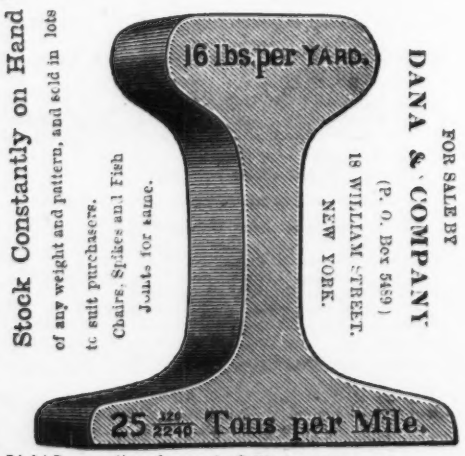

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